THE

QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY A. J. BOYD F.R.G.S.Q.

VOLUME XVII.

JULY TO DECEMBER, 1906.

BRISBANE:
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Edited by
A. J. BOYD, F.R.G.S.Q.

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NOTICE.

Queensland Agricultural Journal.

It is hereby notified that the *Journal* will be supplied to all members of Agricultural and Horticultural Societies who do not derive their livelihood solely from the land, on payment, in advance, of an annual subscription of 5s., which will include postage. Schools of Arts will be supplied at the same rate.

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[*Frontispiece.*

LAYING THE FOUNDATION STONES OF THE NEW GRANDSTAND AT BOWEN PARK. *"Queenslander" Photo.*

The National Association.

Last month the council of the Queensland National Agricultural and Industrial Association, to give it the title which the splendid work it is doing for the State so amply justifies, took occasion, at the laying of the three foundation stones of the magnificent new grand stand, now nearly completed, to invite, not only the present members of the council, but all the past members who for the last thirty years have had a seat on the council to take part in the ceremony. It was a most happy thought, and the invitation was much appreciated by those old members who were able to accept it. The building was rapidly approaching completion, but, as the stones were laid on the foundation of the open lofty front of the building, they did not interfere with the progress of the work. His Excellency the Governor, the Right Honourable Frederick John Napier, Baron Chelmsford, who, in conjunction with Lord Northcote, Governor-General of Australia, is patron of the association, laid the first stone in the centre of the building; the second was laid by the Chief Justice, Sir Pope A. Cooper, on the left; and the third by the chairman of the council, Mr. John Macdonald, on the right. There was a large gathering to do honour to the occasion, and a pleasant informal afternoon tea concluded the proceedings. The building is a magnificent structure, and is so placed that the occupants will not be incommoded, as heretofore, by the sun's rays, which shone full in their faces on the old stand. The association is to be congratulated on the enterprise shown, not only in building so fine a stand, but in the many other ways in which they are catering for the comfort and convenience of visitors. Under the supervision of a most able, industrious, and obliging secretary, Mr. Chas. A. Arvier, there is a certainty of a record exhibition of the great resources of the State, and, given fine weather, there should be also a record atendance.

THE ESTIMATED OUTPUT OF SUGAR.

It is premature to estimate the probable output of sugar for the coming season, but it is the general opinion that in the Far North—that is, from Mackay northward—there will be an increase over last season of about 5,000 tons; while in the Mary, Wide Bay, and Burnett districts the increase will probably amount to double that quantity. In the Southern division, from the Blackall to Nerang, the figures of last season are not likely to be exceeded. Since, however, splendid rains fell during the latter portion of May, the cane has made great progress, and there will be a greater tonnage per acres than was at first anticipated. As evidencing the confidence which, despite the evil prognostications of pessimists, exists amongst those interested in the sugar industry, a new company—the Meadowlands Mill Company, at Mackay—was successfully floated in May last. The object of the company is the erection of a new sugar-mill at Meadowlands. The flotation of this company is a matter for congratulation to the promoters, as the mill will be available for a large number of farmers who have become shareholders.

Agriculture.

PRESERVING CORN STOVER.

During the very dry weather in April and May, dairy farmers in some districts began to get anxious about the supply of grass for the winter. Fortunately, during the last week in May, welcome rain occurred, coming on gently and falling continuously it soaked into the soil, instead of flowing away over the baked surface, as would have been the case had the showers been very heavy and intermittent; and all Nature revived, and a plentiful supply of grass was assured for a time. But we have still the months of July, August, and September before us, when continuous rains are not of usual occurrence. It, therefore, behoves all stock-keepers to make provision against a possible scarcity of fodder, in the shape of silage or hay. During the dry weather we heard many complaints of the grass failing, but in very few instances did we observe any attempt at conserving either bush grass or cultivated grasses in this manner. One form of fodder appears to be generally neglected—that is, corn stover, or the ripened or nearly ripened maize stalks. The reason for this neglect is, that farmers differ in their opinions as to the feeding value of the stalks. Some maintain that they are absolutely valueless, and that the best use that can be made of them is to burn them in the field. Others say that they have about one-half the feeding value of hay. The fact is, that the feeding value of stover depends upon its condition when cut, the quantity fed, and the method of feeding, whether alone or in combination with other forage. A large number of analyses of corn stover have been made, and experiments in feeding dairy stock have shown that stover rations have produced nearly or the same quantity of milk as the hay ration. As a matter of fact, stover should not be fed alone, but in combination with some other feed forming what is known as a balanced ration. Alone, it lacks the sweet smell and flavour of hay; it also is hard, and tends to make the mouths of the cattle sore; hence they soon reject it, or at most eat about one-third of it. The proper plan is to chaff it, damp it, and mix it with other fodder, when the whole will be consumed by any stock, milch cows, or bullocks. Now, as to its feeding value. Let us consider its chemical composition, as shown by an analysis published by the United States Department of Agriculture some time ago. The several constituents appear to be in the following proportions:—

—	Whole Stover Field Cured.	WATER-FREE SUBSTANCE. Whole Stover.	Leaves.	Stalks.	Husks.
Water, per cent.	40·1	...	...	...	...
Ash, per cent.	3·4	5·7	7·9	3·6	3·5
Fibre, per cent.	19·7	33·0	30·6	34·8	32·2
Fat, per cent.	1·1	1·7	1·9	1·6	1·4
Protein, per cent.	3·8	6·4	8·6	5·9	5·0
Nitrogen, free extract	31·9	53·2	51·0	54·1	57·9
Totals	100·0	100·0	100·0	100·0	100·0

To preserve the stover in the best condition for feeding, Professor Lindsey, Massachusetts Experiment Station, recommends that the plant should be cut close to the base when about half of the leaves are dry, and placed in stooks or shocks, with the tops tied together to shed the rain. After standing a while to cure, the ears are husked, and the stover placed back again to complete the drying process. If the grain is ripe, the ears can be removed

at the time of stooking, and husked when convenient. When a husking machine is employed, the cured stover will, of course, be run through the machine and shredded, and the corn husked at the same time. Should the weather be fairly dry, the stover will dry out well. Very wet weather will retard the drying, and cause the stover to decompose more or less in the stook. Should it be stored in such condition, it will mould still further, with a corresponding shrinkage in feeding value. The stover should be housed, if possible, before stormy weather. Being bulky, it will require considerable room. Too close packing prevents the further evaporation of water. When it is not possible to house it, it can be quite well preserved in large conical stacks.

Observations extending over a series of years show that stover, even when due care is exercised in its preservation, generally loses from 15 to 25 per cent. of its feeding value, from the time it is cut until it is fed. This loss is to be attributed to mould, loss of leaves, exposure to bad weather, &c.

THE UTILISATION OF CORN STALKS.

Taking a rough estimate of the Commonwealth farm lands annually planted with maize, we may set the area down at 400,000 acres. The crop is grown either for grain or fodder. When the grain has been harvested, the corn stalks are gathered up and burnt—rarely are they ploughed under. An acre will produce 2 tons of stalks. No one has ever yet come forward in Australasia with a scheme for utilising them, consequently we have been destroying annually probably 600,000 tons of a product which in the United States is worth 12s. 6d. per ton. Thus, our 600,000 tons represent £375,000 absolutely thrown away. If this amount were divided amongst 10,000 growers of, say, 40 acres each, £25 would be added to the income of each such grower, which would almost cover the whole cost of cultivation. The great value of the stalks lies in the conversion of the pith into cellulose, a constituent of smokeless powder, a protection for battleships, as varnish, kodak films, car-box packing filler, linoleum, waterproof cloth, paper, silicate packing, and as many more uses, the various forms of which the farmer has never dreamed. The outer part which encloses the pith is made into cattle feed, &c. There are three or four cellulose plants in the United States which deal with corn stalks. They have cost as much as £20,000 to instal, and three are run by a 50,000,000-dollar (£10,000,000) syndicate, which controls all the patents covering the processes.

But apart from the scientific manipulation of corn stalks, let us still look to the simple utilisation and conservation of them as fodder for stock. We have shown how the stover can be used in this manner to advantage when chaffed and mixed with other fodder. We go farther, and show the value of

CORN STOVER IN THE SILO.

A great deal of green maize silage is made in Queensland, but we rarely hear of a farmer harvesting his grain and then ensiling the dry stover. Some excellent corn stover silage was made at both the Westbrook and Hermitage State Farms, and was exhibited at Bowen Park, at the N. A. Association Exhibition in 1903. It was thought highly of by farmers, but they seem to be averse to experimenting, so the State farm lesson was lost upon all but the sapient few. In America farmers are for ever experimenting. Here it is the last thing thought about. Following is what a farmer in New York State did in the matter of ensilage:—He grew a heavy crop of maize (9 acres), intending it for the silo, but, finding that it produced an enormous quantity of cobs, he allowed it to ripen, then cut the corn, which was 14 feet high, and shocked it in the usual American way. The corn when pulled and husked tallied 1,200 bushels. The stover was then chaffed, and a ½-inch stream of water was blown into the silo with the fodder. The silage turned out sweeter than green silage. His cows yielded from 8 lb. to 10 lb. of milk more per

cow per day than before using the stover silage. This farmer was told that the stover silage could not possibly be as good as that made from green maize in the ear, but his experience showed him that it was better, and that the results in harvesting, feeding, and returns were greatly in its favour.

In every case, the stover must be steamed before feeding to milch cows or young animals, and the ration made up with other mixtures, such as green lucerne, lucerne, wheaten or oaten hay, steamed bran, boiled barley, &c. It is beyond all reason to suppose that corn stover of any feeding value can be saved from stuff that has been allowed to remain too long in the shocks in the field exposed to the weather and vermin of every description, but well-saved corn stover may be compared in feeding value to good oaten hay.

DOES MIXED FARMING PAY?

It all depends upon the farmer. It is one thing to "go on the land," and quite another to make work on the land a success, for success will only follow when the man on the land understands his business. Many people, tired of town life, picture to themselves the pleasures of rural life. They see ideal farms, with comfortable homesteads, waving wheat fields, lucerne clothing the soil with rich, succulent fodder, maize and potatoes all giving promise of a rich harvest. Their enthusiasm for rural life is heightened by a visit to the milking yards, the dairy, the piggeries, the stables, and the fowlyard. It all looks so beautiful that they forthwith decide to go and do likewise. They have quite left out of the calculation (for, of course, calculations of profits have been made, and proved most satisfactory—on paper) the great factors in successful farming. Amongst these are—the selection of suitable land, well watered and grassed, and consisting principally of rich soil; the location in a district having easy communication with a market; and the intimate knowledge of the farmer of his business, his energy, perseverance, and economic methods of working. They do not picture to themselves the years of hard labour from morning light to dewy eve which were needed to clear, fence, and break up the land—the losses by drought, flood, and diseases incident to both crops and stock. All these are hidden under the mantle of the present prosperity of the man who has made farming his life business. One of the troubles of persons who wish to take up a farming life is, that their ideas of the size of a farm are so greatly exaggerated. Because they cannot get an area of 400 or 500 acres in a suitable locality, they will not condescend to start on 100 or 150 acres. Yet, look round at hundreds of the best cultivated and most paying farms in Queensland. On an average they cover about 100 or 150 acres, and of this area very often only 50 or 60 acres are under crop. The rest is either used as paddocks or is left entirely unutilised. Why pay for and be taxed on land which will lie idle for many years? Better 50 acres intensely cultivated than 200 only partly worked. Some years ago we showed how on a 30-acre scrub farm located on navigable water on the Brisbane River a farmer made an average gross income of over £400 per annum. His produce consisted of maize, potatoes, sweet potatoes, lucerne, pumpkins, cabbages, swedes, a large variety of vegetables, bananas, grapes, strawberries, peaches, and passion fruit. The live stock comprised 38 fowls, pullets and cockerels, two or three cows, 10 pigs, and 20 hives of bees. It is true that prices for such commodities were much higher between the years 1860 and 1870 than they are now, and there were fewer farmers to compete with each other. But even in 1885 a farmer started in a small way at Warra. He worked on the Western Railway line and took up a homestead of 160 acres of scrub land. Of this he utilised 100 acres, which were placed under cultivation and used partly as paddocking for stock. He and his two sons worked the farm, and the average net income was over £200 per annum.

When he started the farm, he had the experience of a lifetime as a farmer and gardener, yet people told him he would not be able to grow stuff enough to feed a snipe on it. He proved them wrong. The land was all scrub, over-run with wallabies. To-day he farms what he calls "a second Canaan," and has never regretted taking up the selection. It has turned out a real success. The reason that people fail at small farming he considers to be that they know nothing about the business. They start with the belief that anyone, any ignoramus, can work a farm, and by and by they find out that they require a knowledge of the work to enable them to succeed. There are numbers of small farmers who are doing as well as our Warra friend, especially those who make dairying a specialty. The monthly cheque for cream is a certainty. So long as good cows are kept, and plenty of fodder is grown for them, and they are well looked after, the farmer has a certain source of income, and whatever he grows in excess of what is required for the cattle is so much to the good. It goes without saying that the small farmer must work early and late, and manage with as little hired labour as possible. Intense cultivation on a small farm will bring far more grist to the mill than slovenly farming on a big estate.

An instance of "big things on little farms" has been furnished to the "Sydney Daily Telegraph" lately, in the shape of particulars of the returns from a farm in the Shoalhaven district of New South Wales, occupied by Mr. Thos. Daley. Mr. Daley's farm is 151 acres in area, and is subdivided into 21 paddocks. He keeps in milk a herd of 45 Shorthorn cows. Subjoined are the figures submitted for the nine months, January to October, 1905:—

Milk cheque	£471
Calves sold (this year's rearing)	121
Profit on pigs (all bred by owner)	57
Fat cows sold	41
Maize grown (35 bags)	40
Potatoes	8
Poultry sold	11
Profit on horses	10
Increased value on young horses during year ...	20
Value on calves on hand	22
Total	£801

Completing the year, Mr. Daley anticipates that his milk cheque for the last quarter will reach £130; that he will sell pigs to the value of another £20, and fat cows to the value of £12. This will bring the year's returns up to £963, which, it may be allowed, is a sufficiently handsome return for that acreage.

Up to a month ago Mr. Daley employed no labour other than that of his own family.

Here we have proof positive, if it were wanted, that an energetic man who understands his business can make a good living on a small farm of 150 acres. It is not stated how many of Mr. Daley's family help him in the work, but, at all events, the profits are retained in the family. With such examples before them, good men need not have any fear of not succeeding in gaining a living from the soil. Those with no experience, and who are not used to hard manual labour, would have to expend much of the profits, if not all, in paying for labour—a fact which should always be borne in mind.

MARKET GARDENING.

NOTES FOR BEGINNERS.

Although it is not possible to lay down absolute rules for seasons of planting in all districts of a State which covers so large an area as Queensland, and in which it may be said that all the climates of the temperate, sub-tropical, and tropical world are to be found, still there are some general principles which apply in almost any part of the country in relation to market gardening. Therefore, a few brief notes on this interesting form of agriculture will be found of service to those who are about to enter upon the business without any previous knowledge of the times and seasons for sowing and transplanting. Some vegetables may be sown where they are to remain and produce a crop, but most of them are best raised from seed in seed beds, to be afterwards transplanted. The seed beds require careful preparation. The soil should be a friable sandy loam, and must be as clean as deep cultivation, the removal of roots, and the destruction of weed seeds can make it. It must be fairly rich, or must be made so with well-rotted manure or leaf-mould. A clayey soil is to be avoided, yet it should not readily fall away from the roots when the plants are lifted. A light shade of bush material should be provided, not dense, but just sufficient to allow the broken sunlight to fall on the young seedlings. Ti-tree boughs are the best for this purpose. They can be supported on forked sticks and saplings. As the plants grow, the shade should be reduced, otherwise they will, in seeking the light, grow up spindly and weak, and no such seedling will ever make a satisfactory plant. Sow the seeds thinly in drills, and instead of raking them over, which process often results in the seeds being dragged into a heap, shake fine leaf-mould thinly over them, bearing in mind that vegetable seeds should not be covered deeper than their own diameter. When watering, do so in the evening, and next day stir the soil gently between the drills to prevent the possibility of the soil baking.

Broad Beans.—This vegetable likes a stiff, deeply-cultivated soil, well drained and heavily manured. Mark out the rows 2 feet apart if a dwarf variety is sown, and 3 feet apart for the tall sorts. Set each seed 5 inches apart in the rows. About 4 quarts of seed will be sufficient for an acre. As soon as the beans are set, nip off the tops of the plants to make them throw all their energy into maturing the beans.

French Beans.—These may be sown at the same distances apart as broad beans, but the soil should be lighter and warmer than for the latter; 2 quarts are sufficient for 1 acre. They may be covered 1 inch deep, and, as they grow, hill them up. This helps to retain moisture and to support the plants. The running or climbing varieties should have their runners cut, to throw strength into the pods.

Beets.—Sow the seeds where there is abundance of light and in the position where they are to mature. If necessary, however, they may be transplanted. The soil must be dug deeply and even trenched two spades deep, digging the manure deep down to induce the tap root to go down in search of the food, of which they take up great quantities. Beets are a very exhausting crop. Mark out rows 18 inches apart, scatter a little fine soil along these rows and sow the seed on it as thinly as possible, because the plants will have to be thinned out to 9 inches apart from plant to plant. The seeds should be steeped for 12 hours in cool water, and be sown whilst still damp. Cover to about half an inch. Two ounces of seed are required for an acre.

Broccoli.—Broccoli thrives admirably in this State, but it will not grow properly in the hot summer months. It requires a rich, deep, light soil, and should never be planted on ground which has previously been under any of the cabbage family. The seed bed should not be shaded by trees: the movable shade above mentioned is all that is needed. When planting out, place the

plants about 2 feet to 2 feet 6 inches apart. White and Purple Cape, Grange's Early White, and Elletson's Mammoth are good varieties. Two ounces of seed will suffice for an acre.

Brussels Sprouts.—This excellent vegetable thrives best in the cooler portions of the State, such as the Darling Downs. It is best grown on poor soil. The plant rises up with a very long stem. The top leaves form a spreading head. The large leaves should be broken down to facilitate the formation of the little cabbages which are produced from the axil of every leaf. Heavy manuring should be avoided, as it causes loose, tasteless sprouts to be formed. The sprouts should be gathered when they have the appearance of half-blown roses. Plant out in rows 3 feet apart with 2 feet between the plants in the rows. Two ounces of seed will sow an acre.

Cabbage.—The magnificent cabbages seen at the various shows afford ample evidence that the climate is admirably adapted for their production. Cabbages love a deep, rich, open soil. Give them plenty of manure and frequent watering. The seed may be sown broadcast and thinned out afterwards, but generally it is preferable to sow in seed beds and transplant. Sow in drills and cover lightly with leaf-mould. Then water gently. When the seedlings are from 4 to 6 inches high, transplant them into rows from 18 inches to 2 feet apart according to varieties. It is well to snip off the extreme ends of the roots before planting out. Digging between the growing crops will be of great advantage in keeping the soil loose. After digging, draw some soil up to the stems of the plants. Mulching, liquid manure, and a little lime are all factors in producing large, well-flavoured cabbages. St. John's Day, Early York, Large York, London Market, Sugarloaf, King, and Flat Dutch are good early and medium sorts; whilst for late crops Schweinfurt and Drumhead are suitable.

Savoy Cabbage does well here. Its cultivation is the same as that for ordinary cabbage. Dwarf Greening, Curled, and Drumhead are the varieties usually grown.

Cauliflowers may be treated in the same manner as cabbages, except that when the flower is forming some of the leaves should be tied across to preserve the flower from discolouration by exposure. The best kinds to grow are the Large Asiatic, Eclipse, Early Dwarf, and Le Normand.

Carrots.—The carrot requires a light, rich, sandy loam of considerable depth, which should be dug two spades deep. The ground should have been heavily manured for a previous crop; thus the manure will be evenly distributed throughout, and good clean carrots will result. Get the surface of the ground fine, and sow either broadcast or in drills. As the seed is liable to hang together, it should be well rubbed in the hands, mixed with sand to separate it previous to sowing, and, as it is very light, it should be sown on a calm day. On light soil, not subject to binding in wet weather, the seed should be gently and evenly trodden or rolled in, and then raked. On land of a more retentive nature, it should be raked in only. Thin the plants out to 5 or 6 inches apart, and ply the hoe freely to keep down weeds and stir the soil. Early Horn is a fine-flavoured carrot, and, on account of its habit of growth, is adapted for cultivation in soils which would be too shallow for other varieties. The Intermediate, Long Orange, and Altringham are suitable for deep soils, and the latter and the White Belgian are excellent food for cattle and horses.

Celery.—A good, deep, rich vegetable mould in a moist situation is that best suited for celery. For the seed bed or box, make up a mixture of fine loam, leaf-mould, and sand. Sow the seeds thinly, cover very lightly, preferably with sifted stable droppings or decomposed manure, and slightly shade them. When the plants are up and the rough leaf is a little advanced, prepare a bed by mixing 2 inches in depth of well-rotted manure with about 3 inches of the soil. Level the surface, water thoroughly, and, a few hours afterwards, in the evening, plant out the seedlings 5 or 6 inches apart. Slightly shade them, and then prepare a similar bed for planting out for succession. For the final

planting, throw out trenches 1 foot broad and 1 foot deep, at 5 feet apart from centre to centre. At the bottom, lay 4 inches of well-rotted manure, and dig it in with a fork. Give the whole a good soaking with water. Now take up your plants, being careful to leave a ball of earth on the roots. Now take a stiff piece of brown paper, and make a collar or case, and wrap it round the lower part of the plant, leaving the top free. As the plant grows, this can be lifted. The object of this is to enable you to heap in the soil against the plants without any of it getting inside them. Keep on drawing the earth up to them to within 6 inches of the top. This must always be done in dry weather. Give plenty of water and occasionally some liquid manure. A little salt sprinkled on the soil once or twice, followed by a good watering, will be beneficial. One ounce of celery seed will be sufficient to plant out an acre. We have blanched celery by letting the plants grow to 1 foot or 15 inches, and then enclosing them in an earthenware drain pipe. The whole of the plant inside the pipe was perfectly blanched.

Onions.—A rich mellow soil with a dry subsoil is what onions demand. Give the ground a deep digging in January or February, with a good supply of manure, leaving it as rough as possible. At the end of February, give the ground a good dressing of soot and ashes, and dig it over, breaking all the lumps. Throw it up into beds of convenient width, and sow rather thickly in drills 1 foot apart and 1 inch deep. Tread the seed in firmly, and rake over lightly. When the plants are 6 inches high, transplant into beds similarly prepared into rows 15 inches apart and 8 inches from plant to plant in the rows. In transplanting, only the root must be placed in the ground; the little bulb must be above it. By planting deep, the proper development of the bud is prevented. Keep the ground perfectly clean during all the growing time, and when the leaves begin to turn yellow bend down the tops just above the bulb to facilitate ripening. Onions may also be sown in drills and thinned out to 8 or 9 inches between the plants, the plants which are removed being used either to fill up misses or to form new beds. About 8 ounces of seed will serve for an acre. The best time to plant out onions is April, but splendid crops have been got by sowing in September.

Leeks.—Leeks may be treated when transplanted from the seed bed in the same way as celery—namely, by planting in trenches and earthing up. The leaves may be shortened back two or three times during the growing season.

Lettuce.—Sowings of lettuce may be made monthly for succession in seed beds. In very rich soil, lettuce may be sown and afterwards thinned out to 15 inches apart. Cos lettuce may be blanched by tying the plant round with banana-fibre, bringing the top to a point, so as to prevent the rain entering.

Endive.—This salad plant may be cultivated and treated like the lettuce.

Garlic.—Garlic, like eschallots, is propagated from the young bulbs. They should be planted in the winter. Press the lower half of the bulbs into the soil. Leave them in this state, without covering, until the spring. Then, when hoeing, draw the soil over them, so as to form a level surface. The soil that suits onions will also suit garlic.

Eschallots.—These may be propagated throughout the year by division of the roots. Plant in the same way as onions, in rich, sandy soil, and keep them well watered. By planting them on the top of small ridges, the roots only will be in the ground, and the bulbs will develop like small onions.

Parsnips.—These are cultivated in the same way as carrots. They take a long time to come to maturity.

Peas.—Peas may be sown from January to May and even later. Yorkshire Hero, sown in May or June, is an excellent cropper. They require a rich, light, well-drained soil. They should not be sown too thickly. The dwarf sorts should be sown in drills 2 feet 6 inches asunder, the peas being thinned out to 5 or 6 inches apart in the rows. The very tall varieties should be planted 8 feet apart, and two rows of cabbages may be grown between.

Kohl-rabi.—This excellent vegetable is not appreciated in Queensland as it should be. It is really a turnip-rooted cabbage. It should be planted on heavily-manured land, 18 inches apart each way. The bulbous portion of the root above ground and the youngest leaves are eaten. They should be gathered quite young, as the turnip-like flesh inside toughens with age.

Spinach.—Sow thinly in well-dug, well-manured land, in drills 18 inches apart, and thin out to 9 inches apart, using the young plants for table. When the plants are well developed, keep on using the outside leaves for culinary purposes until the flower stalks appear. The prickly spinach is the most hardy and best suited for the winter crop—the round variety for the summer crop.

Radish.—Sow occasionally throughout the year, on rich soil. Sow thickly, and thin out as they come on. Make sowings about every fortnight for a succession.

Rhubarb.—Rhubarb roots are so easily procurable from seedsmen that we do not advise market gardeners to go to the trouble of raising plants from seed. If the seeds are sown in August, it will be June before the roots are ready to plant out for good. Plant the roots 2 feet apart each way, in very rich, moist soil, free from stagnant water below. Water occasionally while growing with a weak solution of guano, liquid manure, or soapsuds. Cut the flower stems as they appear. Should they appear during the first year, it is a sign that the ground is not rich or strong enough or has been badly prepared. Mulch during the hot weather.

Artichoke (Jerusalem).—Jerusalem artichokes are propagated like potatoes. They will thrive in any situation, and spread so much as to become troublesome to eradicate. Plant in the spring, but even in February and March if tubers have not been available before those months. Plant 15 inches apart, in rows 3 feet apart.

Artichoke (Globe).—This is another of the vegetables neglected in Queensland. The plant is propagated by means of suckers, which are planted early in spring, when about 10 inches high, in rows 4 feet apart and 3 feet from plant to plant, in deep, rich, moist loam, well manured. The situation should be open. Shade with large pots, and water freely in dry weather. In October, remove all small suckers, and mulch the ground with 3 inches of manure. The beds will last five years.

Asparagus.—For asparagus beds, the very best soil must be chosen. The best is a good, deep, sandy loam, dug deep, and well manured. A sprinkling of salt should be added to the surface a month or two before the planting season. Just before planting, the ground should have another good dressing of well-rotted manure, be again trenched, at least 2 feet deep, and again well sprinkled with salt. During May or June, mark out the beds 4 feet wide, running north and south. Cut a trench 6 inches deep perpendicular about 9 inches from the side; against this place the plants, at 15 inches asunder, with great care, spreading the roots out and leaving the crowns 2 inches below the surface. Fill in the earth quickly to avoid too long exposure. Now make two other rows in the same manner, and the bed is complete. Until the plants are established, give them plenty of water in dry weather. From September, right through the summer, apply liquid manure plentifully twice a week, and also give a dressing of salt every month. In May, cut the stalks down, and dig the beds lightly over with a fork, at the same time digging up the paths between them. For the winter, cover the beds with a good dressing of manure. Begin to cut in September, using a long knife, and cutting below the surface. To ensure the tender shoots being well blanched, the European growers place earthen pipes or wooden tubes, about 1 foot long, over them.

Herbs.—No vegetable garden is complete without herbs. These are generally easy to raise from seed. If plants can be obtained, so much the better. They may be sown any time between April and August. Each particular variety should have a small bed, about 3 feet wide, to itself.

Fennel is propagated from seed or by division of the roots.

Marjoram.—Sow in light soil and thin out, or in boxes. It grows and spreads rapidly.

Mint.—Propagated by division of the roots. Will grow in any fair garden soil and spread rapidly, the roots running a long distance underground and sending up shoots at every joint.

Parsley.—This most useful herb may be sown two or three times a year, but preferably in February or March and in August. Sow thinly, in drills 10 or 12 inches apart. When the plants are strong, cut them down, to induce strong, curled foliage. If not regularly cut, parsley plants will go to seed in one season.

Sage.—Like other shrubby herbs, sage may be grown from seed, by division of roots, and by cuttings.

Rosemary and *Thyme* are propagated in the same manner.

To Dry Herbs.—Gather on a dry day as the flowers are beginning to open. Carefully go over them, and remove dead leaves and any foreign matter. Tie in little bundles; hang in a dark, dry place, where a draught can get at them. When quite dry, rub off the leaves, sift and clean out all dust and twigs. Then place the leaves in wide-mouthed bottles, and seal airtight. Do not on any account dry herbs by sun or fire heat. If they are treated as above, they will keep their flavour indefinitely.

SUNDRY MANURES.

A lecture delivered by Mr. MacLurg under the auspices of the Irish Board of Agriculture, which is strenuously endeavouring to instruct the Irish farmer in the best manures for different crops in various parts of the country, contains the following recommendations for manure mixtures which have been widely circulated all over Ireland:—

Oats and Barley.

1 cwt. sulphate of ammonia
3 cwt. superphosphate
3 cwt. kainit.

Turnips.

10 tons farmyard manure
4 cwt. superphosphate
8 cwt. kainit
1 cwt. sulphate of ammonia.

(Or without farmyard manure.)

2 cwt. superphosphate
2 cwt. pure dissolved bones
1 cwt. bone flour
½-cwt. sulphate of ammonia
2 cwt. kainit.

Mangels.

15 tons farmyard manure
4 cwt. superphosphate
2 cwt. sulphate of ammonia
2 cwt. kainit.

Potatoes.

15 tons farmyard manure
1 cwt. sulphate of ammonia
4 cwt. superphosphate
1 cwt. muriate of potash.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE.

RETURNS FROM 1ST TO 31ST MAY, 1906.

Name of Cow.	Breed.	Date of Calving.	Yield of Milk.	Per cent. Butter Fat, Babcock Test.	Commercial Butter.	Remarks.
			Lb.		Lb.	
Angel ...	Holstein-Devon	11 April, 1906	972	3·6	39·19	
Lass ...	Ayrshire	15 Mar. ,,	868	3·8	36·94	
Jeanie ...	Ayrshire Sh'rth'rn	21 April ,,	903	3·6	36·41	
Nettle ...	Shorthorn ...	18 April ,,	839	3·8	35·71	
Mona ...	Holstein Sh'rth'rn	16 Jan. ,,	885	3·6	35·68	
Mince ...	Ayrshire ,,	22 April ,,	807	3·8	34·35	
Clare ...	Jersey	22 April ,,	632	4·8	33·98	
Ping-pong ...	Ayrshire Sh'rth'rn	26 April ,,	778	3·8	33·11	Sent to Biggenden State Farm on 31st May, 1906.
Kit ...	Shorthorn ...	17 April ,,	834	3·5	32·69	
Magpie ...	Holstein Sh'rth'rn	4 Feb. ,,	786	3·7	32·57	
Poppie ...	Guernsey Jersey	11 Feb. ,,	587	4·8	31·56	
Blank ...	Jersey Ayrshire	17 Dec., 1905	638	4·4	31·44	
Cocoa ...	Jersey	9 Oct. ,,	495	5·0	27·72	
Beatrice ...	,, ...	22 Jan., 1906	471	5·2	27·43	
Chocolate ...	Shorthorn ...	27 Oct., 1905	610	4·0	27·33	
Auntie ..	Ayrshire	18 April, 1906	647	3·6	26·09	
Grace ...	South Coast ...	10 Nov., 1905	481	4·7	25·32	
Lavinia ...	Ayrshire	14 Dec. ,,	560	4·0	25·09	

PIGS FOR PROFIT.

Mr. James Long, author of "The Book of the Pig," writes as follows on the white breed of pigs, but, as he says, the principles which have been enunciated apply equally to the large blacks or Berkshires, some of which are well adapted to do similar work; to the improved Tamworth, and to all pigs which approximate a good type, and which have any claim to be regarded as swine of economical value. We take the article from the "Weekly Irish Times":—

Pig-feeders adopt a variety of methods in their practices of breeding and feeding for profit, these methods being either dictated by custom, by taste, or by expediency. While some make pigs pay well by breeding pure stock for reproductive purposes, others prefer to rear gilts for sale at an adult age, although they have no claim to purity of breed or specific excellence; while others either breed young pigs, which they convert into porkers at an early age, or buy weaners with the same object. It is a curious fact that the price of the pig varies more than the price of any other variety of live stock produced for food, nor is it quite clear why these variations occur. It sometimes happens that, while pig food is cheap, pigs are dear, and when pig food is dear the pigs, on the contrary, are cheap. There are some who have made the mistake of purchasing pigs when food is exceptionally cheap, subsequently making an attempt to dispose of what stock they possess when foods are dear, or when pigs themselves are so low in the market that the prices they realise do not permit of profit. It is useless to follow lines of this kind; we must take the markets as we find them, and it will generally be found, for this is the teaching

of men of experience, that where the stock is good, the feeding economical, and the business department managed on business principles, for every £4 spent £1 will be returned in the form of net profit. Pigs should, in a word, return 25 per cent. upon the outlay, but there are many instances in which this figure is not reached, for reasons which are too obvious to those who know what poor stock many persons feed, how imperfect are their arrangements, how few are their opportunities, and, it may be, how heavily they are compelled to pay for food in consequence of their want of means.

THE MOST PROFITABLE SIZE.

Let us take the size which is preferred by some of the great curers as the basis of the principle of feeding young pigs for the market. Messrs. Harris, of Calne, for example, pay a higher price for pigs weighing from 130 lb. to 190 lb. than for any others. This is dressed weight, but it is conditional upon the fat on the thickest part of the back not exceeding 2¼ inches in depth. It may further be pointed out that where the flesh of the carcass is soft, or wanting in quality, which amounts to much the same thing, and especially where it is poor in the flank, it does not realise so much in the hands of a bacon-curer as it ought to do. If the curer's price is followed from week to week, a better idea will be obtained of the possibilities of a maximum profit than where pigs are allowed to take their chance in the open market, either in the carcass or in the live form. A good deal of judgment is necessary in estimating the weight of the live pig, and consequently its value; whereas, when the carcass is sent to the dead meat market, however carefully it may have been cooled, weighed, and packed, it is almost certain that something will be deducted for short weight, or that the price quoted prior to despatch will have fallen by the time the animals have reached their destination.

BREEDING AND FEEDING.

One of the best methods of breeding and feeding for market is to select a deep-sided half-bred, white sow, with a broad loin, plenty of room through the heart, great length, good hams, ear and snout of more than average length, and a comparatively fine collar. A thick collar is, like short noses and short ears, indicative both of rapid fattening and of excessive fatness in the carcass when the animal is slaughtered; whereas length of ear and snout is not only indicative of a smaller aptitude to lay on too much fat, but of prolificacy and size. The small white pig has the smallest snout on record; it becomes excessively fat, while its size renders it an impossible servant of the feeder for the market. The large-bred white, on the contrary, with comparatively long nose and ears, is more or less the reverse of this; while the middle-bred white is between the two extremes, if the word extreme may be employed. The half-bred, white, country sow, however, carries longer ears and snout, and a finer collar than the large York, hence it is that we get power both to grow and to fatten with rapidity without the production of excessive fatness in a good cross. In both animals retained for stock we should look for the carcass points to which we have referred, and, in addition, to a fairly abundant crop of fine hair, and to what we may describe as energy of character, such as we find in an animal which, when at liberty, does not hang about the sty or the yard, but gets abroad in search of its own food. A stock sow, in a word, should not only be of typical breeding form, but full of activity; for such a sow will impart constitution and power of growth to her progeny, whereas the influence of a boar of the large York variety will correct any tendency which might exist on the part of the young to grow without making sufficient flesh. In some cases it is found useful to mate middle white boars with large long-snouted sows where the tendency to feed slowly and to grow too lanky is marked, but in a general way where white pigs are kept the practice which we have suggested will be found successful.

In practice it is necessary to stick as closely as possible to dates if we would obtain from a sow two litters per annum. The date of the birth of the spring litter is not less important than the date of the birth of the autumn litter, for in order to obtain the autumn litter at the right time we must take care that the spring litter falls at the right time; if this is late, the autumn litter will be late, and the pigs may not be out of hand, as they should be, before severe weather arrives. The stronger and healthier the litter, assuming them to be properly bred, the quicker they will feed and leave the sow, and this is all-important, for where litters are left with the sow too long dates are at once thrown out of gear. Strong, well-growing litters can be weaned at eight weeks, and quickly got on to a fattening ration, so that they may speedily reach a market weight and return the best profit. When a sow is in farrow, she is usually, and we think properly, fed upon middlings, which at an average price will cost about 2s. 6d. a week, something depending upon the size of the sow and what extraneous food she is provided with in the shape of wash or garden refuse; or, as in summer, what grazing she gets or cut green food, or, indeed, as in winter, when her meal is supplemented with swedes, mangels, and refuse potatoes.

Middlings are found the most useful for the production of milk, and here let us suggest that nothing is more important in a sow which is kept for breeding purposes than that she should be a good milker, carrying plenty of teats. It is when sows have insufficient teats, or when they do not produce sufficient milk, that large litters include so many non-thrifty pigs, of which one at least is usually present. The breeding sow may get middlings right up to the time when her pigs are weaned, but this food may be supplemented by clean wash, refuse vegetables from the house or the garden, and grazing where that is possible. It is not, however, well that young pigs should be dragged about a field with their dam. The object of the pork-breeder is to get them fat as quickly as possible, and he is able to ignore such conditions as would make vigorous and healthy adults. Young pigs may, therefore, be kept very much to the sty, if that is sufficiently large and clean, all they need being a sweet bed, protection, and plenty of food.

SOME OF THE MOST USEFUL RATIONS.

After weaning, the middlings may at first be continued, the fattening ration being gradually introduced. What that ration should be has not only been determined by practical feeders, but by careful experiment, such as that which was made by the Wiltshire committee, of which Mr. Harris, of Calne, was the chairman. Although a large number of rations were tried, the most useful were a mixture of barley meal, separated milk, and potatoes; maize meal and separated milk; while barley meal and separated milk took the third place. Much depends, however, upon the relative prices of barley and maize, for at the present time there is no doubt that barley meal, milk, and potatoes is the best of all rations. A large proportion of the Irish bacon, which is among the best in the world, is produced by the aid of milk and potatoes, but it is believed to be inexpedient to supply young pigs with more than 3 lb. of the tubers in a day. A ration, therefore, of a gallon of separated milk, 3 lb. of potatoes, and as much barley meal as the young pigs choose to eat, will not only produce meat which cannot be excelled in quality, but will feed the pigs so rapidly that they will return a higher profit than perhaps any other ration which can be suggested.

It may be pointed out that the addition of milk involves some care, for, according to the practice of Professor Henry, perhaps our greatest authority on swine-feeding, it is possible to supply too much milk to pigs; so that where a gallon is exceeded, although much depends upon the size of the animals, there may not be increased production of meat sufficient to pay for the increase

of food given. Professor Henry found that the value of skim milk for pig-feeding was determined more by the food with which it was mixed than by the breed. When 1 lb. of maize meal was employed with from 1 lb. to $3\frac{1}{4}$ lb. of milk, $3\frac{1}{4}$ lb. of milk saved 1 lb. of the meal, or, in other words, 1 lb. of the meal was equal to $3\frac{1}{4}$ lb. of the milk. But as the quantity of milk was increased per lb. of meal used, so was the value of the milk diminished. Thus, when 3 to 5 lb. of milk was employed its value was reduced in relation to the meal, and that value was further reduced when more milk was added. Thus it becomes essential to learn what quantity of meal pigs consume, and, as far as possible, to give them from $3\frac{1}{4}$ to $4\frac{1}{2}$ lb. of milk per lb. of meal, where maize is employed. The feeder, however, who is not able to use milk may buy it with profit to himself if he can do so at 1d. per gallon. Where this is impossible, it will be found advantageous to add big potatoes, costing not more than £1 per ton, using them in connection with either barley meal or maize meal, which, at the present time, is probably the more expensive food of the two. When pigs are bred for stock purposes, we may suggest the addition to the meal ration of a small quantity either of bone meal or of hard wood ashes, at least once daily. It has been found that such an addition provides two materials—lime and phosphorous, both of which are deficient in many of the foods supplied to pigs kept in a sty, and the result is not only more rapid growth, in consequence of the help given to the growth of the bones, but stronger constitutions and greater aptitude to lay on flesh. Wherever the constitution is helped, this should follow as a natural sequence. In very many cases large white pigs which have been purchased at considerable cost fail to produce young stock which reaches a similar size to their own. This size may be the better ensured by the adoption of the suggestion which we have made.

SOME GOOD TYPES OF SHORTHORNS.

We have received from the owner, Mr. George Tate, of "Oakdale," Kangaroo Valley, New South Wales, the photographs which are here reproduced, of two very fine Shorthorn cattle. The enterprise shown by many breeders of Shorthorns in the various States of Australia has resulted in greatly improving the dairy herds in many districts.

Daphne, the prize milking Shorthorn cow here depicted, is the property of Mr. Tate. She took the first prize for best Shorthorn cow at the Berry show in 1905 and 1906, and in 1905 she bore away the championship in her section.

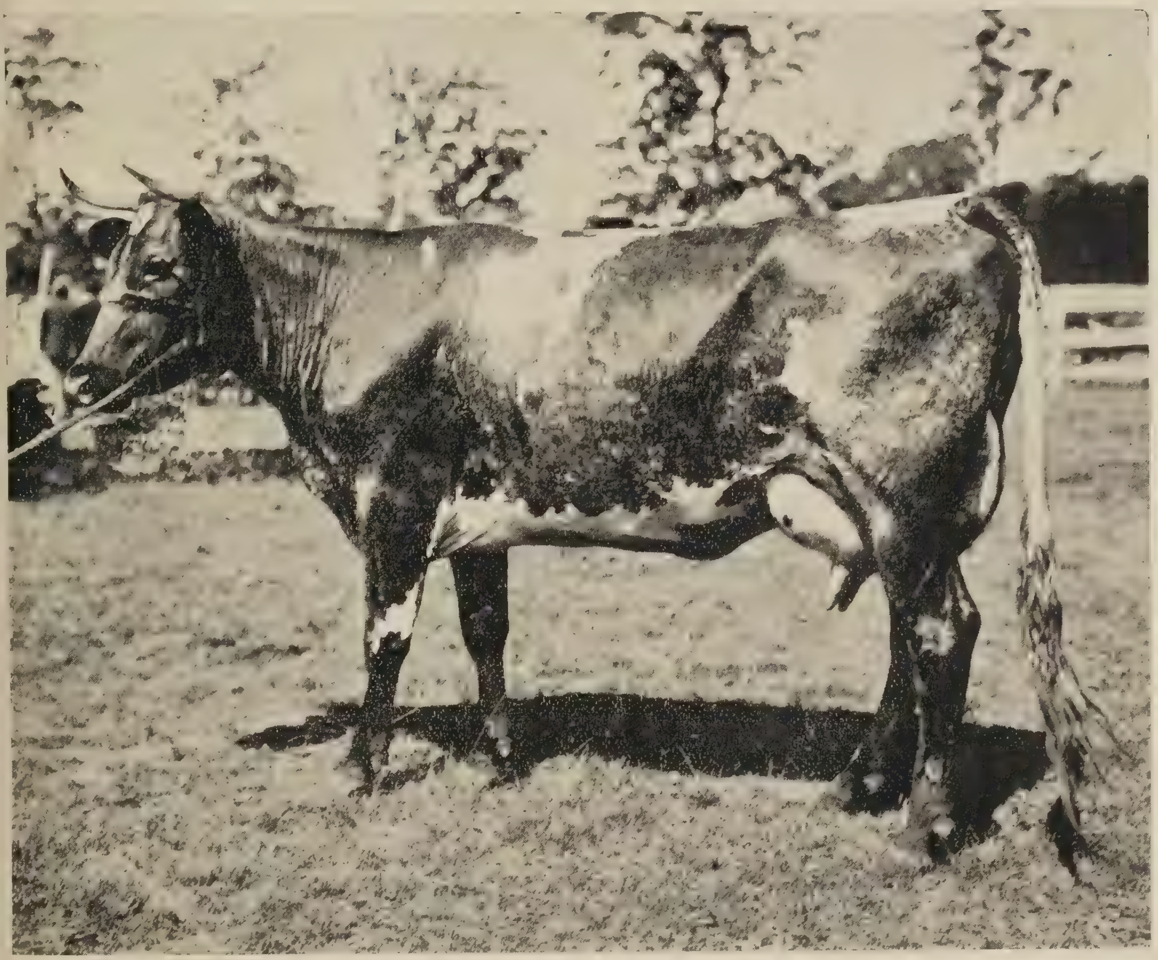
Aristocrat is a splendid type of a young Shorthorn bull. He was bred by, and is still the property of, Mr. Tate. His honours are—Winner of first prize as Shorthorn bull, one year old, at Berry show, 1906; also champion Shorthorn bull, any age, at the same show; first prize yearling Shorthorn bull at Kangaroo Valley show, 1906; and first prize yearling Shorthorn bull at the Royal Sydney show in 1906.

HOW CATTLE TUBERCULOSIS IS DEALT WITH IN GERMANY.

[FROM A GERMAN CORRESPONDENT.]

Many advertisements of cattle sales in the German agricultural papers nowadays contain this notice:—"The herd is subjected to Professor Ostertag's method of extinguishing tuberculosis." In a pamphlet issued by the Schleswig-Holstein Chamber of Agriculture this method is clearly explained, and the conditions are set forth under which anyone can benefit by this system, which

Plate I.



is particularly recommended on account of its simplicity and thoroughness. There is no doubt that the great expectations which were raised by tuberculin have been disappointing, for, although a large number of cattle respond to the injection, only very few of these are eventually found to be suffering from an infectious form of tuberculosis. On the other hand, about 10 per cent. of the animals inoculated without effect are, when slaughtered, proved to be suffering from the disease in an advanced stage.

Professor Ostertag has entirely discarded the use of tuberculin. As tuberculosis only spreads by infection, it is of paramount importance to detect the disease in its early stages, and get rid of the affected animals immediately. This not only ensures the safety of the herd, but decreases the loss borne by the owner, as tuberculous cattle depreciate very rapidly in value, and on that account alone it is well to discover suspicious cases early. Though it is easy enough to detect tuberculosis in an advanced stage, this can only be done effectually in the early stages of the disease by means of a searching clinical examination of the animal by a veterinary surgeon, followed by a thorough bacteriological examination of the milk, saliva, or other excrements, according to whether the disease has attacked the udder, lungs, intestines, or other organs. A properly equipped bacteriological institute was erected by the Schleswig-Holstein Chamber of Agriculture at Kiel in the year 1903, and very definite results have already been attained. Previous to 1903 the system of Professor Ostertag had been on trial in other parts of Germany. It is interesting to note that 2½ per cent. of all the animals examined had to be destroyed, but the very fact of their being done away with at once lessens the risk of further infection and larger losses in later years.

Hand in hand with the destruction of dangerous animals, it is most important to ensure the protection of calves from the risks of infection. This is best done by giving them boiled or pasteurised milk, for calves are very susceptible to infection, though the disease implanted by germs in early life frequently does not show itself until much later. Now, as to the methods of benefiting by the Ostertag system, anyone wishing to do so must agree to have his cattle examined at least once a year by a certificated veterinary surgeon, designated by the Chamber of Agriculture. Any animal found to be in a suspicious condition must either be immediately removed from the cowshed or so placed as to avoid standing face to face with other cattle pending the result of the bacteriological examination. If the animal is declared dangerous, it must be sold at once. The result of the bacteriological examination is treated as entirely confidential, and is submitted by letter direct to the owner.

The charge for the clinical as well as the bacteriological examination is as follows, and payable to the Chamber of Agriculture for Schleswig-Holstein at Kiel:—

1.—A premium of—
- (*a*) 5s. for every herd of 25 head.
- (*b*) 10s. for every herd of more than 25 head.

2.—An annual payment of—
- (*a*) 6d. per head up to 50 head.
- (*b*) 6d. per head up to 50 head, and 2½d. per head beyond.

There is an extra charge of 2s. per head for bulls above six months old, which are destined for breeding purposes. Smaller herds can only be admitted to the examination at a minimum charge of 10s. per annum.

After more than three years of successful work at Kiel, it is surely permissible to advise others to put Professor Ostertag's system to an equally severe test. It is useless to try and eradicate human tuberculosis unless the root of the evil be attacked, and English authorities might do worse than institute some similar method of procedure.—"Agricultural Gazette," London.

The Horse.

MULES.

The mule, which is greatly prized and valued in many countries of the Old and New World, both for riding, traction, and general farm purposes, has never been adopted, except in very isolated cases, by Australians for any of these purposes. Mules were employed many years ago by Messrs. Cobb and Company for their coaches between Ravenswood and Townsville, and proved very satisfactory, although the leaders sometimes took it into their heads to turn back and look into the coach to see how many passengers there were, or else they would wait until the most precipitous and narrowest part of the range road was reached, when they would incline to the very edge of the precipice and scratch themselves against trees, resisting all the blandishments of the driver until they had finished their scratch.

In North and South America the mule is universally recognised as a most reliable animal for farm work, and it there almost completely usurps the place of the horse. It is the reverse in Australia, although why this should be so is not very clear. We hear a great deal about the number of light mares and horses running on Australian pastures, which have cost as much to produce as £20-horses, and yet are dear at £5. Could these mares not be put to some profitable use? It was stated in "The Agricultural Journal of Victoria" for October, 1905, that many of these could be used for breeding mules. The raising of mules in the United States and in other countries is a very extensive and profitable industry. At a recent sale of donkeys in America, at Limestone Vale Farm, 59 of these animals were sold. Of them, 29 were jacks and 30 jennets. They averaged £96 10s. A jack, foaled in 1901, brought 280 guineas, and the average for the 29 jacks was something under £150. The jennets averaged £45 each, and some went as high as 170 guineas. How do our Queensland horse sales show against this? In connection with this particular sale, the "Breeders' Gazette" says:—"It was a square deal auction from start to finish. Every known defect of the animals was mentioned by the proprietors before the auctioneer asked for bids. Every animal in the catalogue was sold." Whether these defects refer only to unsoundness or to structural defects and vices we know not, but we can hardly imagine a horse-owner or any other owner in this country pointing out to intending exhibitors the faults of their animals. There seems, however, to be a moral in this sale, for it is also mentioned that the sale was conceded to be the most successful public sale of this class of stock ever held in Missouri. It would be a distinct innovation to hear before an auction in this country some such announcement as this: 'Gentlemen, lot 1, as you may observe, is an oldish mare. She may or may not breed again, but it really does not matter much. She has bred a few things—mostly weeds, which never paid the service fee and their board. You may also observe that her feet are none too good, but she is well provided with sidebone, and that splint is fairly prominent. Her wind might be better. She is much too narrow, and looks much like a gelding at the head. You should also notice that her action leaves something to be desired. I might mention, however, she is particularly active when anyone is within striking distance of her heels, and there are one or two other trifles, such as crib biting, &c. Now, gentlemen, start me.'"

In what are mules preferable to horses?

In the first place, a mule is not bred for speed, but for endurance. He does not make a good roadster, he is not stylish, but what he lacks in speed and beauty he makes up in actual usefulness on the farm. A few of the good points about a mule are:—He is easy to raise. He eats very little as compared

with a horse. Owing to his persistent uniform gait, long-sustained, a good mule will beat a horse on a journey. With respect to sickness, few people have ever seen a sick mule. He is proof against diseases which usually attack a horse. Even the African tsetse fly gives the mule best. In proportion to size, he will pull more than a horse and "stay" longer. He will endure hardships which would kill the best horse foaled. He does not seem to be injuriously affected by heat or cold. He is much easier to break in than a horse, and, once broken in, is more reliable, being dogged and persevering. His doggedness is usually called stubborness. "As stubborn as a mule" has become a byword, but this stubborness is one of the mule's best characteristics, because it is the trait which impels him to effort after effort to do the work imposed on him. He is occasionally vicious, but, as in the case of many vicious horses, this is a result of bad training. The "Tennessee Farmer" says that, if a mule team bolts, the mules all look after themselves. They will dodge and turn and avoid obstacles, whereas horses would run blindfold into any obstacle and kill or impale themselves in their blind madness. The Victorian journal quotes Mr. J. L. Jones, of Columbia, Tennessee, a well-known authority on mule-breeding, who says:—"There is no kind of labour to which a horse can be put for which a mule may not be made to answer, while there are many for which mules are more peculiarly adapted than horses; among the rest, that of mining, where the mule is used, and many of them need no drivers. The mule is better adapted for carrying burdens, for the plough, and agricultural machinery, for building railroads, and, in fact, for all kinds of heavy work. I have driven a 16-hand mule, out of a thoroughbred mare, in a buggy with two men and baggage 32 miles in four hours, and she was quite fit and ready to go on." The same journal says, in an article on "Mule-breeding," by W. T. Kendall, M.R.C.V.S.:—

KINDS OF MULE.

There are two kinds or classes of mule—viz., one the produce of the male ass, or jack, and the mare; and the other the offspring of the stallion and female ass or jennet. The cross between the jack and the mare is properly called the mule, while the other, the produce of the stallion and jennet, is designated a hinny. The mule is the more valuable animal of the two, having more size, style, finish, bone, and, in fact, all the requisites which make that animal so much prized as a useful burden-bearing animal. The hinny is small in size, and is wanting in the qualities requisite to a great draught animal. This hybrid is not supposed to breed, as no instance is known to us in which a stallion mule has been prolific, although he seems to be physically perfect, and shows great fondness for the female, and serves readily. There are instances on record where the female has produced a foal, but these are rare.

The mule partakes of the several characteristics of both its parents, having the head, ear, foot, and bone of the jack, while in height and body it follows the mare. It has the voice of neither, but is between the two, and more nearly resembles the jack. It possesses the patience, endurance, and sure-footedness of the jack, and the vigour, courage, and strength of the horse. It is easily kept, very hardy, and no path is too precipitous or mountain trail too difficult for one of them with its burden. The mule enjoys comparative immunity from disease, and lives to a comparatively great age. Pliny gives an account, taken from Græcian history, of one that was eighty years old, and, though past labour, followed those that were carrying material to build a temple. Dr. Reese mentions two that were seventy years old, in England. Mr. J. L. Jones knows of a mule in Middle Tennessee that, when young, was a beautiful dapple grey, but is now thirty years old, and is as white as snow. This mule is so faithful and true, and has broken so many young things to work by its side, that he bears the name of "Counsellor." The last time he was seen by Mr. Jones he was in a team attached to a reaper, drawing at a rate sufficient to cut 15 acres of grain per day.

THE KIND OF SIRE TO BREED FROM.

There are two kinds of jacks—the mule jack and the jennet jack, or combined jack, that is good for either mares or jennets, and is used chiefly in breeding jacks for stock purposes. It is only with the mule jack that we will deal, as the jennet jack is too costly to breed to mares, as a rule, unless the mares are of extra quality.

, A good mule jack ought not to be less than 15 hands high, and have all the weight, head, ear, foot, bone, and length that can be obtained, coupled with a broad chest, wide hips, and with all the style attainable with these qualities. Smaller jacks often produce good mules, and when bred to large roomy mares show excellent results. Black with light points is a favourite colour, but many grey, blue, and even white jacks produce good mules. In America many varieties are to be met with—viz., the Catalonian, Andalusian, Maltese, Majorca, Italian, and Poitou, as well as a native jack. Of these, the Catalonian is considered the best. He is of good colour, possesses clean bone, and runs from $14\frac{1}{2}$ to 16 hands, though he rarely reaches the latter. The Andalusian is about the same size, but of worse colour. The Maltese rarely exceeds $14\frac{1}{2}$ hands, but is of fine quality. The Majorca is the largest, and frequently grows to 16 hands. The Italian is small, but a remarkable good breeder. The Poitou runs about 15 hands, and has heavy bones, long hair, and a good foot. The Kentucky jack, on account of the good grass and limestone formation, grows to a large size, and is preferred by many breeders to any of the imported varieties. These would probably form the best sires for Australia.

THE KIND OF MARE TO BREED FROM.

As already pointed out, the better the mare the better the mule, for it is found that the latter partakes very largely the body and shape of its mother. But, while always preferable to have a sound sire and a sound dam, there are many mares, and especially farm mares, with slight side-bones, or a tendency to ring-bone, or flat-footed, which, though unsuitable to breed to a draught or weedy thoroughbred stallion, would breed good useful mules, for these would not appear in the mule. As the mule is required for draught rather than speed, and increases in value with every inch of his height, and every pound in weight, it would be undesirable to use too weedy mares. It has been stated that the reason that farmers dislike breeding light horses, and prefer draughts, is that the latter can be put to work at two and a-half years old, and the mares worked at slow farm work while in foal, whereas this cannot be done with the lighter breeds, which are a continual source of expense, and earn no part of their livelihood until sold. What applies to draught horses equally applies to mules if the right sort of mares are used.

REARING THE MULE.

While the mule is capable of foraging for himself where an ordinary horse would starve, it is equally true that, with good feeding and kind treatment, he grows into a finer and more valuable animal. The young mule can be weaned at four months old, and will do well for himself if grass is plentiful, so that the dam need not be idle more than half the year; in fact, if well cared for, and only used for slow work, she may be almost worked the year round. At two years old the mule is easily broken. When accustomed to the feel of the harness, if he has already been broken to lead, he will take his place alongside a broken mule or horse, and go to work, and, if well fed, will do his share.

MARKET FOR MULES.

When speaking on this subject at the Farmers' Convention at Colac two years ago, I was asked by a farmer if I thought anyone would buy a mule if he bred one. My reply was that if he bred one and worked him he would

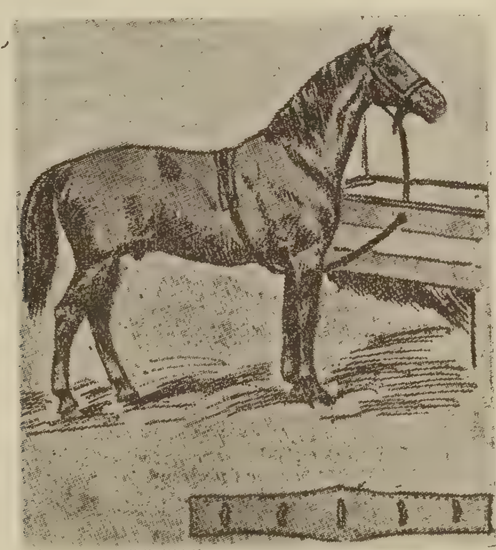
not want to sell him, but would lose no time in breeding more for himself or for sale. With proper encouragement to start it, mule-breeding will soon take care of itself; and whenever the local demand that will arise, when the true value of the animal is known, becomes supplied—and that will not be for many years to come—there is a ready market in India and other countries for all we can supply.

Conclusion.

In making comparisons between the horse and the mule, I do not wish to disparage the former, which I think the most beautiful as well as the most useful animal that has ever been domesticated by man. My only desire is to show that the patient, plodding mule possesses potentialities that are little dreamt of by the majority of Australians. For the explorer, the gold-seeker, the pioneer selector in the Gippsland or Otway Ranges, where vehicular traffic is impossible, or the struggling wheat-grower in the innermost Mallee fringe, the trusty mule is the animal *par excellence* to share his toil, and will well repay a trial.

HOW TO CURE A HALTER BREAKER.

A bad and vexatious habit in many horses is that of halter breaking. When fastened to the manger they succeed in breaking away. To cure this habit, a plan which has been adopted—it is said successfully—abroad is explained by



the following letterpress and the above illustration. A few weeks' trial is said to effect a cure. Take a strong rope long enough for the purpose, and, after doubling it, pass an end each side of the horse, about midway between the front and hind legs. Pass the ends through a ring, then through the hole in the manger, and then tie the ends in the halter ring. When the horse pulls back the rope tightens around the body and pulls him back, so that after a few trials he gives up the plan. To prevent the rope from making the back of the horse sore, make a soft pad of several thicknesses of new unbleached muslin, covered on the outside with a piece of denim or any equally strong, clean material. Make small straps of some of the material and sew to the pad, the rope passing underneath these loops. The illustration shows the idea plainly, one of the figures indicating the shaping of the pad at the centre seam.—" New Zealand Farmers' Weekly."

Poultry.

POULTRY FARMING IN AUSTRALIA.

In an article entitled, "Is Poultry Farming a Success?" which we published in June, 1899, we endeavoured to show that the keeping of poultry on a farm is a source of considerable profit, provided the breeds kept were of a good laying or fattening strain, but, as far as poultry farming as a separate business was concerned, we had yet to hear that any such attempt had proved a commercial success in Queensland. We are still in the same position of doubt, as we know that several enthusiasts have started poultry farms in this State, with the object of building up an export trade in eggs and fowls, with the result that the venture has been ultimately abandoned. If any persons could have made a duck farm pay, it was surely the Messrs. Baynes Bros., at Belmont. They had an ample run, extensive buildings and yards, a specially built incubator house, a thorough expert as manager, the best breeds of Aylesbury, Pekin, and Muscovy ducks, and, in addition, they had exceptional advantages in the economical feeding of the birds, through the medium of their extensive butchering and meat-preserving establishments. Yet these gentlemen, after bringing up the number of their duck stock to nearly 10,000, found it advisable to discontinue the business. It is one thing to make a substantial profit on 50 hens or ducks, and quite another to attain the same results with 500 birds. Putting the cost of feeding at only 1d. per week per bird, the cost for feeding alone amounts to 2s. 2d. per bird from hatching out to the time when they are fit for export. On a farm, the poultry would only cost the fraction of a penny, as there is usually any quantity of scattered grain, wheat, maize, millet, &c., which but for the fowls would simply go to waste. Small potatoes —sweet and Irish—vegetables, and a variety of other food, including a profusion of insects, &c., are also available at practically no cost. Hence poultry keeping on the farm pays very well, but poultry farming pure and simple, except as a breeding place for high-class, fancy, prize birds, and the raising of eggs which realise very high prices, does not appear to have paid anyone. We certainly had an account of the great success attained by Mr. Bunnage some years ago, but we have heard nothing since his account was severely criticised by Mr. W. B. Tegetmeier in the "Agricultural Gazette," London. Mr. Tegetmeier wrote as follows:—

The delusion regarding the profits of poultry farming is not as extensive in England as was formerly the case. One does not see the numerous advertisements of land to let for poultry farms, and those that do appear on the subject are generally of some establishment which the owners, not being able to conduct to profit, are anxious to sell. The delusion, however, has extended to the other side of the world. In the "Queensland Agricultural Journal" appears a triumphant letter from Mr. Bunnage, a poultry farmer, recounting the advantages of his farm. The whole account, apparently so satisfactory, only requires, in my opinion, a slight dissection and the publication of a balance-sheet (which is never forthcoming in these cases) to show the fallacy of the whole proceedings. As many persons are now arranging their establishments for next season, it may not be without advantage to consider the details. Mr. Bunnage states that he breeds between two and three hundred purebred poultry every year. During the breeding season all his birds are in pens, which are wired in at the top and sides, and all the food the birds have is given to them. The size of his pens is 33 feet long by 10 feet wide, the area of a fair-sized sitting-room. The cost of building these pens and the houses they must

necessarily contain is not published nor taken into account, but it must be considerable. In one of these pens he puts three Orpington pullets and one cock. Early in June—the seasons in Australia being the reverse of those in England—the pullets started to lay. They laid 34 eggs in June, 65 in July, and 65 in August, when the account was written—in all, 164 eggs. Ninety-three were placed in an incubator, and 88 were fertile, but whether all the chickens were reared is not stated. This, says the writer, disproves the statement that fowls cannot be kept healthy and vigorous in small runs, which he regards as depending upon the manner in which they are kept, which is as follows:—At sunrise he gives them a scanty breakfast of one-third maize and two-thirds wheat thrown into litter 3 inches or 4 inches deep. In this they scratch most of the morning, finding their food gradually, which he regards as a better plan than feeding them on warm, soft food in the morning. Their next meal is at noon, and consists of green food, lucerne (chopped up), every other day, and neck of beef (chopped up, bone and all) the alternate days. At 5 in the evening he gives wheat and Indian corn, as much as they will eat. For this meal sometimes pollard is used instead of grain. Clean water and grit are supplied.

All considerations of expense, labour, trouble, are put on one side. The cost of making the entirely closed-in pens, and of the shelter for the fowls, is not mentioned. The labour of bringing in enough litter to cover the pens several inches deep, and of clearing it away before it has time to become foul or offensive, is not even alluded to. The price of straw, if straw were used, in this country would be considerable. If the litter were allowed to become soiled, as the corn is scattered amongst it, the fowls would very soon become diseased. The birds lay well because they are all young pullets at their first laying, analogous to what our early hatched pullets would be in December. If they are kept a second year under these conditions they would become bad layers, even with the advantage of the time, which is alluded to, when they are not kept in the pens, but where ground would be required for their exercise. The eggs during the second year, when the hens would have lost condition, would not be as fertile. The cost of food, which is all supplied, I can hardly speak of, as I do not know the exact price of grain in Queensland. The cost of lucerne, if it had to be bought, should be regarded, and, if it has not to be bought, it has to be cut and chopped up, and I should think, on days when the fowls get no other food in the middle of the day, it would form a very unsatisfactory meal. The purchase of the beef and the expense of chopping it up, bones and all, into small pieces, for the support of the fowls would certainly not be slight. Then, again, the cost of rearing the chickens, which would require a very considerable proportion of land after they are hatched in the incubator, is not even alluded to; and it is not stated whether this so-called successful poultry farming is to be regarded from an egg-producing or chicken-producing point of view. No balance-sheet whatever is published; but it is obvious that such would at once disprove the conclusions of the writer that, because he has obtained 164 eggs from three young pullets in their most prolific state in the most prolific months of the year, therefore his poultry farm must be a success. If an accurate balance-sheet were published at the end of two years, there is no doubt in my mind that Bunnage's poultry farm would show a considerable loss, as has always been the case in this country.

In a work which I wrote—"Poultry for the Table and Market"—I collected together accounts of the most advantageous conditions under which poultry farms had been founded, and there was not one of them that was not a lamentable pecuniary failure. Poultry as an adjunct on a farm, where land costs nothing, and attendance, conveyance to market, &c., very little, may be kept to profit, or by the cottager who runs his fowls at large; but poultry shut up in pens of this kind are an invariable and inevitable loss.

Let us, however, be fair. *Audi alteram partem* is always a good rule. The other and opposite view is taken by Mr. De La Bere with respect to poultry farming; but, be it noted, his poultry farm contained only 20 hens. We shall also have a word to say in proof that duck farming has paid in Australia. Mr. De La Bere says:—

Gloucestershire.—Results obtained from 1st March, 1898, to 1st March, 1899, from 20 hens confined within a yard, 36 yards by 16 yards. Yield of eggs:—March, 424; April, 446; May, 441; June, 444; July, 372; August, 308; September, 236; October, 182; November, 200; December, 143; January, 222; February, 291—total, 3,709.

Dr.	£ s. d.	Cr.	£ s. d.
To 20 hens at 3s. each	3 0 0	By 20 hens at 2s. 6d.	2 10 0
Poultry-house, 30s.; appliances, 10s.	2 0 0	10 pullets reared at 3s. ...	1 10 0
		8 cockerels at 2s.	0 16 0
5 per cent. interest on capital ...	0 5 0	3,709 eggs at 1s. per dozen ...	15 9 1
Cost of corn and meal	4 11 0	Manure at 18d. per head ...	1 10 0
Green food	0 5 0		
Two sittings of eggs	0 2 0		21 15 1
Labour at $3\frac{1}{2}$ hours per week ...	1 10 4	Contra	11 13 4
	£11 13 4	Profit, 10s. 1d. per head	£10 1 9

Note.—As it is necessary that certain items should be common to each balance-sheet, to fairly compare one return with another, I have fixed the price of each flock of fowls subjected to the test as though they were purchased in at 3s. per head at the start, and sold out at 2s. 6d. at the close of the year. I also fix a common price for roosting the fowls in a wooden house at 30s. for 20 head, or £2 for 40 head, and the value of the manure at 18d. per head, or £1 10s. per ton. The labour question is also dealt with upon the same lines. Attendance on each field poultry-house at a distance from home six hours per week, and homestead houses at three and a-half hours. Lads' wages, 11s. per week. The above prices are as fair an average as it is possible to fix, to compare the true merits of the different birds tested and profits realised.

The somewhat high average price obtained from the above yield of eggs is accounted for by the facts (1) close proximity to a town market; (2) large size of eggs; (3) large number laid through the winter months. The cost of purchased food, it will be seen, is returned at about 1d. per head per week, but this was augmented by certain kitchen refuse which would have been otherwise wasted. This scrap refuse from a family of six no doubt much conduced to the laying properties of the flock, which attained the high average of 170 eggs per head, and this, after deducting 300 eggs as the estimated yield of the ten pullets reared, and which laid through the winter.

I trust that the highly satisfactory profit of 10s. 1d. per head shown by this return will encourage many poultry-keepers to forward me their balance-sheet, although they may not have kept their stock strictly upon the poultry test rules.

P.S.—The accuracy of the above return may be relied on. The eggs were recorded daily, and the invoices of food purchased carefully filed. Let me, however, warn enthusiasts who, after reading the above, think that by setting up 20 hens they may attain equal success. This may be possible, but is highly improbable. A profit of 5s. per head is seldom exceeded with flocks of 40 head, although 8s. per head is often realised where only a dozen or so are kept under favourable circumstances.

We draw special attention to the P.S. paragraph, in which Mr. De La Bere warns enthusiasts that such profits *may* be made with 20 hens, but not with 40. In fact, the general experience seems to be that the egg production per head decreases as the number of hens is increased.

Now we will consider the case of a profitable duck farm, of which we have evidence in the remarkable success of a duck farm at Botany, Sydney, N.S.W. Those who have visited Botany will recollect that there much of the land is sandy and covered with patches of low scrub. It is on such a site that the duck farm is situated. It was started about the year 1896, and in 1899 the annual output of ducks reached to somewhere about 14,000, and has, we understand, proved to be a very remunerative business. The land is divided into paddocks and yards, of which latter there are several suited to the various conditions of the business. In one are collected vast numbers of ducks, whose business is egg-laying. The breeding ducks have a quiet yard to themselves, whilst the quarrelsome Muscoveys live and breed and fight in a spot quite apart from the rest. There are many small yards provided for hens which are employed in hatching out ducks' eggs. Fifteen incubators are also kept constantly going, and of course "mothers" have to be provided for the young ducklings from the incubator. These "mothers" can accommodate some 400 ducklings. From 8,000 to 10,000 eggs are sent to market every week in addition to those which are "set." The food of the birds consists of greenstuff, bran, pollard, wheat, and boiled liver. The export trade is restricted to Aylesburys, which fetch larger prices in the London market than Muscoveys.

To sum up, we find that the most profitable fowls are those which are kept in small numbers on farms and orchards. The vast trade in fowls and eggs of the United States of America, which amounts in value to nearly £60,000,000 per annum, of which large sum eggs alone account for £33,000,000, is derived almost entirely not from huge poultry farms, but from the aggregate of the farmers' poultry yards. There is no reason why a very large export trade in poultry and eggs should not be profitably carried on in Queensland. A reference to our statistical pages will show that a very handsome profit has been made on all shipments of frozen poultry both by the Department of Agriculture and Stock and by private companies, amounting in late shipments to from 2s. to 2s. 6d. per pair net profit for chickens and from 3s. to 3s. 6d. for ducks.

THE UTILITY OF EGG-LAYING COMPETITIONS.

Commenting upon the results of the egg-laying competitions which were concluded during the first week in May at Blenheim and Lincoln, New Zealand, the "New Zealand Farmers' Weekly" says that these competitions marked a new departure in the history of the New Zealand poultry industry, and, if the results achieved were not altogether up to anticipations, they have at least served a very useful purpose in demonstrating, first of all, the profitable nature of poultry-keeping, and in further directing public attention to the strains that are likely to prove the most profitable. As will be seen from the results which appear elsewhere, the Blenheim competition was far more successful from the standpoint of egg-production than that conducted at Lincoln College, the first ten pens in each competition aggregating 11,875 and 9,636 eggs respectively, or a difference of 2,239 eggs in favour of the Blenheim birds, the average per pen being $1{,}187\frac{1}{2}$ eggs at Blenheim and $963\frac{3}{5}$ at Lincoln College, that per bird being $197\frac{9}{10}$ at Blenheim and $160\frac{3}{5}$ at Lincoln. On the other hand, possibly owing to the greater number of entrants, there were eight pens at Blenheim which fell below the lowest of the Lincoln record. The bottom pen in the Marlborough competition returned 421 eggs only. As against this, however, the Blenheim averages for the whole competition of 863·39 per pen and 143·89 per bird were considerably higher than the Lincoln averages of 793·97 per pen and 132·32 per bird. The best week's laying by individual pens was 39 eggs at Blenheim (this being the record put up by pens of Rosecomb Black Orpingtons and Silver Wyandottes, the latter twice) and 37 at Lincoln, Silver Wyandottes and Black Orpingtons again putting up the records.

White Leghorns were very much in evidence at Blenheim, seven out of the ten prize-winners, who had pinned their faith to the strain, securing averages per bird of $226\frac{5}{6}$, $206\frac{5}{6}$, $198\frac{1}{3}$, 198, $195\frac{2}{3}$, and $188\frac{2}{3}$ (two pens). The pen of Silver Wyandottes which secured sixth place averaged $193\frac{5}{6}$ per bird, the Black Orpingtons (placed seventh) $190\frac{2}{3}$, and the Brown Leghorns (placed eighth) 190 eggs per bird. At Lincoln College the highest average was made by the Silver Wyandottes ($213\frac{1}{3}$ per bird), which also secured the third and fourth places with averages of 165 and $163\frac{5}{6}$ eggs per bird. The Brown Leghorns, which came second, averaged 167; the Black Orpingtons (placed fifth and tenth), $153\frac{5}{6}$, and 146; the Buff Orpingtons (placed sixth, seventh, and eighth), $150\frac{1}{2}$, 150, and 149 eggs per bird respectively; and the Anconas, which came ninth, produced 147 eggs per bird. The contrast in these figures is sufficiently great to arrest attention, although it would possibly be unwise to attempt to make deductions from them without taking into account the weather conditions and the climatic influences upon the birds themselves.

The more genial sunshine of the Marlborough province would doubtless have had its effect upon the birds housed at Blenheim, and the unusually damp weather, with the many cold snaps experienced during the past season in Canterbury, must have affected the birds at Lincoln. The wet weather certainly handicapped the lighter breeds, and this would account for the Silver Wyandottes and the Buff Orpingtons coming out so far ahead of birds which are recognised as belonging to the best laying strains, such as the Leghorn.

The second egg-laying competition (which has begun at Lincoln College) is likely to show an advance on the first, because, as Mr. W. Lowrie, Director of the Agricultural College, has pointed out to a Press interviewer, it includes "birds bred from proved laying strains," which were wanting in the first competition. Last year, Mr. Lowrie says, "Exhibitors were more or less in the dark as to what to expect of their birds, but this year we have a number of pens of the same blood as the most famous laying strains in America, Australia, and New Zealand"; and the average should, therefore, be considerably higher, while the competition, with 100 pens occupied in place of 38, is likely to prove all the more profitable. In the first competition, it should be noted, all the birds more than paid for their keep, as the bottom pen produced 577 eggs, which realised about 52s., whereas the cost of the food was from 30s. to 36s., certainly not more than the latter sum.

A similar competition, which was conducted at Gatton Agricultural College, Queensland, and which closed in March, cost £53 1s. 6d., and netted £105 9s. 8d., 29 pens being entered at 10s. each, and prize money being awarded to the amount of £13 13s. in connection therewith. The net profits of the competition amounted to £51 17s. 2d.; the average cost of food per bird was 1d. per week, and the average profit per bird for the twelve months was 5s. $11\frac{1}{2}$d.; the average price realised for the eggs being 8s. 2d. per dozen; the net profit of the winning pen being 8s. 1d. The figures thus given indicate pretty clearly the payable nature of such competitions, and also of the particular industry they are designed to promote. They form particularly useful object lessons of what can be accomplished with poultry on the farm. May we not hope that the example set by the South, and that the English and Australian experience, may induce the farmers and poultry-breeders of the North to take similar action with a view to holding an egg-laying competition in, say, the Auckland province An attempt is being made to arrange a duck-laying competition, but surely an effort might be made to initiate a more general competition later on. There is sufficient contrast between the Blenheim and Lincoln College competitions to give rise to the belief that climatic conditions may necessitate the breeding of different strains in the North to those which have proved the most successful in the South. Ought we not to take the opportunity of practically demonstrating what are the best strains for the North? Given a standard strain, we can breed up to it, and thus make the poultry industry increasingly profitable.

The Orchard.

THE FRUIT FLY.

Mr. S. C. Voller, Ludlow Orchard, Enoggera, who has on several occasions contributed some valuable and very readable articles to the Journal on subjects connected with the fruit-growing industry, particularly on his methods of dealing with the fruit fly, has lately again taken up the latter question in the following letter to the "Brisbane Courier." However absurd it may appear to attempt to get rid of the pest by catching the flies by hand or squeezing them to death between two oranges, or even by catching them in a butterfly net, the fact nevertheless remains that Mr. Voller in one season some time ago saved almost the whole of his orange crop, when neighbouring orchards were devastated by the fly. Mr. Voller writes:—

"Every intelligent fruitgrower in this State will, I am sure, welcome the appearance of recent letters in your paper, and also the report of the deputation from the Chamber of Agriculture to the Minister, on the subject of the fruit fly. I, for one, am more than pleased, because such action is bound to do good, and the subject undoubtedly needs tackling properly. The deputation mentioned, as well as each of your correspondents, touched upon some point or other of importance and deserving of practical attention; but may I be allowed to express the opinion that the fruit fly pest has got to be dealt with on very broad lines? I do not think that any single 'remedy' will ever be found to effect its eradication. So far as parasites are concerned, we have yet to learn that Nature will allow the balance of things to be so completely upset that the destruction of the fly could be accomplished. And, even were this possible, it would take years to do it, and we should go on suffering in the meantime. All the same, there is every good reason why parasites should be used, if they can be got to help. Mr. Main's idea about the peaches is a good one. There is no better breeding-ground for the fly than the thousands of useless rubbish called peaches all over our coast country, and particularly in the suburbs of our towns. There are a few fairly good and useful types grown, I admit, but the majority are no good to anyone, and it would be a great blessing to the fruit industry if they were wiped out. The guava might be mentioned, also, as a fine 'host' for the fly, more especially as it can be found growing outside in quantities in some districts. But the destruction of these trees will, to my mind, only come in as part of the broad scheme necessary for fighting the pest. Many things can and should be done by growers, and every possible aid to the work be made use of. I believe strongly in putting the Diseases in Plants Act in operation, in order to compel some people to do what they would not attempt otherwise. A foolish minority should not be allowed to menace the whole industry. Further, I believe in appealing to the common sense of the people generally to get them to do what they can individually to assist the industry. The case of your correspondent, 'G. W. M. H.,' is an illustration of how this is possible; and if some people are willing to assist by even taking out peach-trees, others may be got to do something else that may be equally useful. The first thing to do is to stop breeding the enemy. At present it is being bred in countless thousands in many directions. The stoppage may be effected in several ways—

"1. By the destruction, by owners, of every tree that is really of no commercial value to them. 2. By the avoidance of planting similarly useless trees. 3. By the gathering and destruction, by boiling for a couple of minutes, of all dropped fruit every day or every two days at the outside. 4. By the use of certain forward or early maturing trees as trap trees, as the fly will always be found on such trees in force before it spreads to give its attention

to the rest of the orchard. The process here is to go and catch the fly by hand; kill it on the spot. Some of your readers may smile at this, and be inclined to ask what I am giving them; and I may say in passing that I have, in the past, been held up to ridicule in print for advocating this same thing; but, all the same, I was never more serious, and I know the value of what I am suggesting. On my own place this season, as my orange crop has been maturing, I have had two early trees in particular, on which I have caught hundreds of flies in the course of a few weeks, just by giving half an hour now and then to the matter, and I know what the result would have been had I let these enemies spread and breed, as they would have done. Take a loose orange in one hand, walk quietly round the tree until you see the fly on another fruit, place the free hand gently behind this fruit, and bring your loose orange, held by your finger tips, slowly up to the fly, and when at close quarters bump him with it. It may seem childish work, but it pays. I have also put a boy on, with a little butterfly net on a light bamboo rod, to catch flies out of hand reach, and that pays too. I know of a few others besides myself who have been persuaded to try this, and they are all satisfied that it pays well. 5. By the use of 'tanglefoot' on some of the best of the dropped fruit, as they are on the ground. Many a fly can be caught this way.

"All this is useful work for the individual grower, whether in a big way or small, and we need to enlist the earnest co-operation of all, so that the enemy may at least be reduced to a minimum, and the fruit industry enormously improved. So long as present conditions are allowed to continue, this State will lose more than many people may readily believe, and the fruit industry be kept back. Mr. Arthur Exley, in your issue of 22nd instant, draws attention to the boy with the gun, and this matter certainly needs prompt action to prevent the destruction of many of our best friends."

MANURING STRAWBERRIES.

Strawberries in Queensland are usually grown on such fertile soil that manuring the plants is never thought of. For instance, at Cleveland, Wellington Point, Mooloolah, Mapleton and Montville in the Blackall Range, the strawberries grow to perfection in the virgin scrub and forest soil. There are, however, many suburban growers who find it necessary to apply some kind of manure if they intend to raise a good crop of large berries. The following notice by the Department of Agriculture at Washington, U.S.A., reprinted in "Garden and Field," will, therefore, be of some interest to growers of small patches on poor soil:—

Some interesting facts are afforded in regard to suitable manures for strawberries by a recent bulletin issued from the Department of Agriculture at Washington on experiment station work. On the basis of the results of analysis a crop of 6,500 lb. of strawberries, which is considered a fair yield per acre, will remove from the soil 8·4 lb. of nitrogen, 10 lb. of potash, and 3·5 lb. of phosphoric acid. Though the strawberry is not an exhausting crop, it is found in practice to require a far more liberal manuring than most fruit crops, because of its short growing period. Well-rotted stable manure is the fertiliser most generally recommended by the experiment stations for strawberries. It should never be used fresh. If not well rotted, it is generally full of weed seeds and fungus diseases, and conducts a rank growth and poor fruit. Fertilised plots in 55 experiments yielded on an average 5,197 quarts per acre, or about 2,000 quarts above the average, thus showing the value of manuring. The potash and phosphatic fertilisers were much more effective than nitrogenous manures, especially on lands well supplied with humus. The fruits grown with these were better coloured, better flavoured, and firmer. The nitrogenous manures, including heavy applications of farmyard manure, gave too much growth of leaf, and the fruit was softer and of inferior quality.

Plate II.

French's Improved Native Raspberry.

1. The Original Fruit. 2. The Improved Fruit.

IMPROVEMENT OF THE NATIVE RASPBERRY

(*Rubus rosæfolius*, Sm.)

In most of the coastal districts of Queensland the native raspberry may be seen growing luxuriantly, and the canes covered with the red berries look very pleasing at the fruiting season. The raspberries are pleasant to the taste, but lack the size and luscious flavour of the cultivated raspberry. It occurred to Mr. W. French, horticulturist at Wellington Point, that it might be possible to improve the fruit, even to imparting to it the flavour of its cultivated congener. After considerable patient experimenting, he has at last succeeded in very much improving the wild variety, at all events in respect of size and quality of fruit. We were shown the spray here illustrated, by Mr. T. H. Wood, nurseryman, George street, and the improvement was at once evident. The fruit in the circle, Fig. 1, shows the raspberry in its wild state, and in Fig. 2 we see how it has been "Burbanked" to produce larger fruit of better quality and more of it. Mr. French intends to continue his experiments until he has evolved, as he thinks it possible, a good, edible, marketable raspberry.

Mr. F. M. Bailey, F.L.S., Colonial Botanist, in his "Sketch of the Economic Plants of Queensland," 1888, writes:—

RUBUS, *Linn.*—Order ROSACEÆ—Tribe *Rubeæ.*

R. IDÆUS, *Linn.* The raspberry fruits on the Downs, but has not been a success on the coast lands; but if hybridised with our native species (*R. rosæfolius*, Sm.), a hardy fruitful kind might probably be obtained; the wild one fruits well but is wanting in flavour. A few American blackberries bear abundance of rich juicy fruit around Brisbane; one of the most prolific is that known as Lawton's Blackberry. Propagated by suckers or layers.

PRODUCING POTATOES WITHOUT HAULMS.

From an exchange we clip the following wonderful (*sic*) item of news:—"A greater novelty than the seedless apple has now made its appearance. It is nothing less than a potato grown without producing any top or haulm. The specialist, a Montana grower, claims that he can produce new potatoes every month of the year. He grows the tubers in a box. At an exhibition in support of his extraordinary claims he put on show a package containing potatoes in various stages of growth. Those who were invited to inspect them were astonished at the whole business. The object lesson was a perfect revelation. The experimenter says that he has perfected a compound which closely resembles soil, and is unique for potato production. In a layer of this marvellous material he sets potato eyes only, not seed potatoes at all. When one layer is completed another is started and arranged, and the process is continued until the box is filled. He asserts that neither light nor air are necessary for the potatoes. The box with the developing tubers endorses his claims, nevertheless the experts are completely puzzled at the whole business."

We submitted the paragraph to Dr. Holtze, director of our gardens, and he informed us that he had done the very same thing when he was a lad. He then explained how anyone could obtain the same result with little trouble. The instructions he gave us for obtaining new potatoes at any season of the year are simple—all that is necessary is to obtain a box, fill it with nice loam, place the potatoes in this and leave in a dark cellar for a few weeks, after which it will be found that although the tuber had not made any haulm, runners will be noticed, on the end of which would be found a new potato about the size of a walnut. The doctor, however, ended up by remarking that these would be of little intrinsic value as a food, the tubers being practically tasteless. Anyone of an experimental turn of mind might try the experiment and astonish his friends with the result, but do not, as is evident with this cute American, make capital out of it at the expense of your confiding fellows.—"Garden and Field."

Botany.

CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

BY F. MANSON BAILEY, F.L.S., Colonial Botanist.

Order ORCHIDEÆ.

CORYSANTHES, R. Br.

C. fimbriata, *R. Br., Prod.* A small plant, 1 in. or more high. Leaf orbicular-cordate, about 1 in. diameter; the midrib and reticulate veins alone distinguishable, or the latter sometimes united in a circular vein within the margin; the leaf rarely thinner with veins more conspicuous. Flower or even the whole plant more or less of a violet purple, sometimes nearly sessile, sometimes a little stalked with a small bract; ovary short. Dorsal sepal ½ to 1 in. long, varying from very much incurved to nearly straight; lateral sepals and petals linear, small. Labellum-tube narrow, erect against the dorsal sepal, 4 to 5 lines long, with 2 minute obtuse spurs at the base, sometimes scarcely conspicuous; the lamina reflexed, very large, varying, however, longer or shorter than the tube, concave with inflexed fringed margins; the disk reticulate and hairy inside along the centre. Column very short, much thickened under the stigma, but not winged.

Hab: Dunk Island. *E. J. Banfield.*

Order FILICES.

CHEILANTHES, Swartz.

C. tenuissima, *Bail. sp. nov.* (Fig. A.) The habit and stature of this species is the same as that of *C. caudata*, R. Br. (Fig. B.), with which it was found growing. Stipes 6 in. long, glossy-brown, more or less clothed at the base with curly, brown scales. Frond 6 in. long, bipinnate; lower pinnæ nearly 3 in. long, decreasing in length upwards; the uppermost pinnæ very narrow and simple; pinnules also very narrow, often scarcely ½-line broad, and many 1 in. long, continuous or sometimes the larger ones with an interruption near the base, soriferous throughout. Sori rather large. This new species or variety differs from *C. caudata*, R. Br., in its narrower more slender frond, and in the pinnules being more frequently simple.

Hab.: The Islands of Torres Strait, *T. Tate.* From Mr. Tate I also have a form of *Adiantum lunulatum*, Burm., and *A. dolabriforme*, Hook. The normal form of the species has a more robust habit, and is met with on the mainland at Cardwell and other tropical localities.

THE WORLD'S BUTTER RECORD.

Yeksa Sunbeam, a Guernsey cow, the property of Mr. Riethrock, of Athens, Wis., U.S.A., has won the proud position of the world's greatest butter producer, a record which has been made under the supervision of an advanced register and agricultural experiment station, and, therefore, of unquestionable authenticity. The cow is about nine and a-half years old, and her average weight during the year was 1,150 lb. During the year beginning October, 1904, and ending September, 1905, she gave 14,920·8 lb. of milk containing 857·15 lb. of butter fat, the equivalent of 1,000 lb. of butter. This is a marvellous record, and shows what the Guernseys are capable of doing.

Plate III.

Cheilanthes tenuissima, *Bail.*

Apiculture.

BEES IN THE SUBURBS.

Those interested in apiculture cannot fail to be struck with the rarity of bee hives in the suburbs of Brisbane. It is certainly not owing to a lack of honey-producing plants, for most houses of any pretensions in every direction round the metropolis have very beautiful gardens, constantly in bloom. Within two or three miles of the city there are forest-clad hills and dales where, at some seasons of the year, many kinds of trees are in blossom. It would naturally be supposed that there is room for many thousands of hives. Yet there are probably not 2,000 in all the suburbs of the city put together. There must be a cause for this, because bees are easily kept and managed with a little professional instruction, and they produce an astonishing quantity of honey in a season, yet people prefer to go to the grocer and pay 9d. or 1s. for a bottle of honey which, with little trouble, they might produce for nothing in their own gardens. "The Commonwealth Beekeeper," in answer to an amateur inquirer, throws some light on the matter. The following is an article in that journal which gave rise to "Amateur's" question: "Has surplus honey ever been raised in a suburb?" The article is entitled "Profitable Bee-keeping":—

"Bee-keeping," says the writer, "is so fascinating, healthy, and, at times, lucrative a calling that it is little to be wondered at that many of the leading experts of the industry are so persistent that, in spite of heavy losses, they never seem to tire of going through all the work and expense of again establishing an apiary that through some cause has become defunct. Of every hundred persons who endeavour to make a living out of bee-keeping without experience, I am certain not more than 5 per cent. succeed, and their hardships are so great in attaining that success that very few people would care to face them.

"In writing this I am referring only to scientific and modern bee-keeping, and not to the ignorant box-hive method. To make a profit out of bees, a person needs five years' experience, a locality well-timbered with yellow box and red gum, and as many more varieties as possible, also a mild climate; then there is a possibility of producing from 10 to 20 tons of honey per 150 colonies of bees once in about two years, just according to the ability of the man during the honey flow, everything else being equal. It may be just as well for me to tell how to make a loss out of bees, although I could not possibly enumerate how many or how vast the causes that go to make a loss in bee-keeping. Droughts on the one hand, severe wet weather on the other, heat waves scorching the buds off the trees, disease of various kinds—all come to the beekeeper at some time or another. Over some of these things we have no control, but many people who would like to keep a few hives of bees to add to their income generally find it is the reverse to what they expected, because the locality is very often unsuited to bee-keeping, or the methods adopted might make bee-keeping a loss in the very best of localities. They are so accustomed to see what is always termed 'garden honey' in grocers' windows that they fall into the error of thinking that garden flowers are the source from which honey is gathered, not knowing that 'garden honey' is only a trade term. If I mistake not, the main product of all highly-scented plants is not honey, but perfume; and the small quantity of honey that bees gather from a mile or two of cottage gardening is not fit for consumption, usually having a strong and peppery flavour. Of course, if a town is surrounded by a variety of good honey-yielding trees, the garden flowers are of value to build up strong colonies.

which will store a nice surplus of honey when the trees bloom. Therefore, the position of a person's hives plays a prominent part in the profits. Garden flowers will keep the colonies in their needs, but little surplus to the owner, and a very inferior honey at that; whilst a good supply of our leading timbers will yield honey of good quality which will well repay the apiarist for his labour and outlay in keeping his apiary in good condition during the dearth of our worst years or the severity of the longest winters."

"The answer to the above inquiry," says the writer, "would largely depend on the locality, for there is a great difference in the flora available in any one place as compared with another.

"Some suburbs produce fair quantities of honey, but poor in quality, such as ti-tree honey along the coastal suburbs.

"Surplus honey of good quality to the extent of 56 lb. and even 100 lb. per colony have been taken in several instances by one suburban bee-keeper on rather poor management, and securing an average of 67 lb. in a well-known suburb, but it was not gathered from cottage gardens.

"Then, again, I have purchased hives at Kew with 30 lb. of honey, but of small commercial value in itself, because the colour and flavour were bad.

"Bee-keeping in the suburbs cannot become a lucrative calling unless the bees are within easy distance of a plentiful supply of clover or red gum trees, &c.

"I think, with careful management and close attention, I could make a ten-pound note out of twenty colonies in some of the suburbs of Melbourne, but an amateur could not do so.

"I have no desire to throw cold water on any budding young bee-keeper, but I am asked a straight question, and I must give a straight answer; and that is, that suburban bee-keeping, speaking generally, will not be profitable bee-keeping.

"The reason that many people think bee-keeping will pay in the suburbs is because they are accustomed to see so many flowers abounding in the well laid out gardens that are to be seen in and around Melbourne.

"I have given the matter much thought in the past, as the quantity of bloom is ample in most suburbs for 100 colonies, but two things upset all calculations. The first is, that the suburbs are over-stocked with bees; the second is, that the bulk of the blossom does not produce honey, but scent only.

"I have found such a quantity of persons with from 1 to 12 hives in the different suburbs that I believe there must be 100 hives to every square mile of houses.

"No doubt a valuable amount of knowledge can be gleaned from the beehive anywhere (and a little honey), but the only way bee-keeping pays is to get into the country.

"My apiary of over 100 colonies would simply starve each other in Essendon.

"The best place is the country, and the best honey-yielders are yellow box, grey box, and red gum; good results may be obtained from other varieties of timber."

THE JOHNSTONE MILL.

A deputation recently waited on the Treasurer to urge the establishment of a central sugar-mill on the Johnstone River. The outcome has been that it has been decided to form a company with a nominal capital of £20,000 in £1 shares. The company will be styled "The Johnstone River Central Mill Company," and among other objects will be that of building a sugar-mill on the Johnstone River, where the manufacture and refining of sugar will be conducted. It is expected that the mill will be built in time for the 1907 crushing, and that it will have a capacity of 4,000 tons.

Tropical Industries.

THE COTTON INDUSTRY.

By DANIEL JONES, Department of Agriculture.

ITS ECONOMIC IMPORTANCE.

The great unrest characteristic of the situation in the cotton and other textile trades, by reason of the prospective limitation of cotton supply, calls attention to the occupation of cotton-growing in Queensland.

The question is no unfamiliar one here, as this fibre has been profitably raised in commercial quantities on many occasions during the past forty years.

It is frequently a matter of surprise to inquirers to learn that, thirty years ago, the East and West Moreton districts had over 14,000 acres of cotton cultivation under cotton. It is often asked, "Why the cessation?" The reasons why may be briefly expressed, and relate chiefly to high cost of transport to English markets, slow delivery by reason of long voyages of sailing ships, high charges for ginning, &c.; and to the fact that the seed and its by-products (now a large factor of value) were, in every instance, thrown away. Coupled with these disabilities was the inexperience of growers, which, in a minor degree, contributed to the cessation of cotton-growing by reason of absence of care in selection of seed and due rotation of crops. Owing, however, to the experience gained in the past, the industry now promises to be more firmly established.

Our wider experience in choice of varieties, our knowledge of soils and of the best climatic conditions suited to the numerous excellent types of cotton now in cultivation—all these help to make the path of the cotton-planter more secure. Thus, in a local cultural sense, much valuble experience has been now gained. The rapid increase of the textile industry in Australasia is also an economic factor largely in favour of our cotton-growing prospects.

In the southern States a large and growing demand exists for all the fibre that we can grow, and some years are likely to elapse before the Australasian demand will be overtaken.

This fact, having in view that our average Queensland staple is valued by the British Cotton Growers' Association as higher than the American article, ensures not only a satisfactory price for all cotton forthcoming for some considerable time, but also prompt cash returns, leaving out of consideration the markets of Japan and Manchester that are eager to handle our cotton crops.

It was recently stated by an English expert interested in the textile trade that the chief concern of his Lancashire fellow-spinners lay in the prospect that, in twenty years or so, the rapid increase of American cotton mills would demand all, or nearly all, the American crops for their own needs. Such a factor as this needs emphasising, in order that Queensland might take her right position as a contributor to the world's textile requirements.

Cotton has for many years been very regular in price, the only exception being a little over a year ago, when, owing to a phenomenal American yield, the prices receded; in a short time gaining, nevertheless, normal values, which they have since held. Its economic importance can well be understood when it is realised that returns up to £17 per acre were obtained last year by a grower in the Fassifern district, the average for the district being £9 per acre. In my estimates of profit I have never exceeded £6, in itself a profitable return which amply compensates for all outlay.

Here we see the high economic value of a crop demanding neither capital for its cultivation nor a great deal of agricultural skill; nor is it so fastidious as to quality of soil as other crops.

The range of production in Queensland is demonstrated by splendid samples now before me, and include the territory on our coast-line from Nerang in the extreme south to Somerset, Cape York; thence around the Gulf of Carpentaria as far as Normanton. The cotton-growing districts westward of Brisbane include the Darling Downs and Maranoa regions as far as Charleville, where cotton has been successfully grown by irrigation with bore water. From Rockhampton westward, embracing those suitable climatic conditions which the cotton plant revels in, are areas as far west as Longreach. The most excellent commercial sample of cotton I have seen this season came from Bogantungan, a district 228 miles inland from Rockhampton. The remarkable feature connected with this consignment, which consisted of several bales, is that the long rail transport of 597 miles to Brisbane did not materially influence the profits of the grower. Cotton having so high a value per ton will stand transport charges over long distances which would utterly preclude profits being realised on ordinary farm products.

Mackay and the more tropical areas of our coast-line are well adapted for the cultivation of the longer-stapled varieties, chief of which is the Sea Island, which variety does very well throughout all Northern tropical coastal regions. Very good samples of this cotton have been sent me from many parts. The Caravonica type, although a good staple cotton, and in value not equal to our Sea Island, has the disadvantage of being a slow cropper, particularly so in cold districts. Experiments in the South of the State all indicate its unsuitability.* Some reports to hand from the Northern parts of Queensland also show that Caravonica is not so profitable a cotton to grow as other varieties tried. Its chief fault lies in the fact that it is a long time coming into bearing, other sorts being much in advance of it in this respect. Inland from Cairns, in the district of Atherton, some few bales of very good Upland cotton were produced last season, indicating that the tableland region can produce a good commercial article. Some very good samples of the Caravonica type have been grown by Mr. Jardine (of Somerset, Cape York Peninsula), to whom this Department is indebted for very much useful experimentation in regard to proving the value of various types of cotton.

Apart from the rural aspect of the industry, the manufacture of cotton-seed oil will respond to the extension of cotton-growing. This is now a huge industry in the United States of America, England, and parts of Europe.

To give tabulated figures is not within the scope of my article, but, as the business employs thousands of hands and millions of capital, it is sufficient to indicate this as a very important phase in the production of cotton. Textile manufactures, such as cotton spinning and weaving, in Australasia will depend for their stability very materially upon the development of cotton-growing in Queensland. A good market for the raw product is open to us; buyers of the raw material are keen to obtain our output, realising as they do its value owing to its splendid quality.

The establishment of these new openings for industrial activity in the Commonwealth augurs well for the prosperity of our State, more particularly when it is realised that the value per acre produced (setting it down at an average of £6) will rank as equal to most farm products, and exceed many, occupying the ground as it does for only seven months.

COTTON-GROWING AS A FACTOR IN PROMOTING IMMIGRATION.

This form of husbandry will appeal to those acquainted with its nature as the most likely to meet the requirements of the new comer. To be able to indicate a fairly easy and expeditious method of settling people on the soil is a problem often discussed. In cotton-growing we have a pursuit that will not unduly tax either the skill or capital of the embryo farmer. By virtue of its hardihood, of the simple methods of tillage, of the absence of any complicated or costly machinery to either sow or prepare the crop for market, it is easily seen to be

* Dr. Thomatis has stated that the Caravonica cotton is not suitable for the Southern climate.—ED. "Q.A.J."

THE POOR MAN'S CROP.

His requirements are limited to land suitable for the purpose, the means of ploughing and tilling a few acres, and, if a few active juveniles of either sex comprise the members of his household, then he is fully equipped for the culture of this crop. In four months after sowing, his ripe cotton begins to appear day by day; thenceforward for the ensuing three months his increment is steadily advancing. By the time his first crop is gathered the shrubs are almost ready for pruning; and a second year's crop, and then the following year even a third crop, can be gathered from the one initial expense of sowing, the further cost being that incidental to the scuffling and hoeing of the bushes. Added to these advantages, this shrub is the best of all the drought-resisting plants our agricultural community is acquainted with. Several instances are on record where it has survived droughts in which other crops have utterly failed.

It will be seen that new settlers can be safely advised to embark in this pursuit with little liability to loss by reason of these favourable conditions. There is room in our vast cotton-growing regions for thousands of peasant farmers from the British Isles or the Continent of Europe. I feel sure that, if the homeseekers in the overcrowded countries of Europe were advised of the outlook in Queensland, there would be a large exodus from the old lands, to the advantage of this State and the prosperity of the immigrant.

Our liberal land laws, associated with the ever-ready help the State Government is prepared to render by way of assistance to get on the land, as well as advising settlers on the various matters affecting their welfare, render it more easy than ever for the really earnest man to succeed.

Cotton-growing as a Factor in Providing Emergent Labour.

Here, again, cotton seems to meet the requirements of the pastoral industry, and more particularly, although perhaps in a minor degree, to assist the sugar-growing business. The great Western country is well suited for an experiment for cotton-growing as a form of employment for the shearing class who, while waiting for shearing to begin, are frequently for long periods without occupation.

In our early days, I well remember the coalminers at Redbank, on the Brisbane River, cultivating their few acres of cotton on small farms, not too remote from the coal pits. The slack days at the colliery were utilised in tending the cotton crop. There are several of these miner-farmers now in the Moreton districts, who began in this small way, and are now among the most prosperous and practical farmers I am acquainted with. What my old-time collier friends succeeded in doing is still possible to accomplish in districts where sheep husbandry is most in evidence. Whether the station owner prefers to assist his employee by giving him land and other facilities is a matter for his consideration. However, there should be no obstacle or delay arise in giving this matter further attention. His cotton areas will not exact from the shearer more than tillage for about three or four months in the year. If a man with a family, the picking can be effectively performed in his absence. It is true the long inland transport charges will mean a slightly lesser profit than if nearer port. It is now within our knowledge that, if the class of fibre produced is equal to standard, the cost of transport will not prove a barrier to the scheme, as rail charges are paid, if purchased by Kitchen and Son, as advertised in this Journal.

In our sugar-growing districts, cotton of the Sea Island type could be profitably grown on the worn-out cane lands. It is true that in some seasons excessive rains may adversely affect a crop, but experience shows that cotton will stand a vast amount of rain without deterioration, which is contrary to the general opinion.

COTTON-GROWING AS A FACTOR IN THE EMPLOYMENT OF JUVENILES.

A few facts adduced in connection with this aspect of the question may help to remove much misapprehension. It is often airily advanced that the difficulty to be encountered is the question of labour in sufficient quantity to meet the demands of the grower at picking time.

Past experience conclusively shows that, when the occasion arose, numbers of the juveniles of our cities, as well as in a minor degree adults of both sexes, offered their services in adequate numbers to cope with the picking question.

Thirty years ago the Moreton districts cultivated 14,000 acres of this crop, at which period the unemployed question, by reason of this occupation, was not the vexed problem which it has been permitted to grow to. Our population then was but one-half of what it now is, and, arguing therefrom, it is patent that under existing conditions the alarm presenting itself to prospective growers need not in any sense be seriously taken. Another phase to be taken into consideration, and one which has a very prominent bearing on the case, is the large number of suitable workers for the cotton field, who now are a burden to the State, who might profitably be engaged in an occupation which would at once provide them with a decent livelihood as well as solve in a practical manner the problem of how best to deal with that ever-increasing army of people who claim the charity of the State in times of depression or misfortune.

It is very significant to learn from published reports detailing the amount and character of Government relief distributed in the city of Brisbane alone during the month of April, 1906, that so many of the class who are said to be unattainable for cotton-picking are so much in evidence on the list of the relief administration. I particularly wish to refer to this, because employment such as is here indicated should be appreciated by these families. Given favourable rates on our railways at picking time for this class of labour, a mother and her children—proper arrangements having been made beforehand for accommodation—could easily be conveyed to such centres where their services are needed. In former years this practice was much in vogue, and we relied on this emigration from Brisbane for a great deal of our cotton-picking.

By reason of its healthy and light nature, it suits most classes, be they old or young, of either sex, a little deftness of hand, speedily acquired, being all the skill demanded. Working in the open as they do, in fine weather only, during the months from February to May or June, they escape the very hottest of our summer weather. Their earnings also during the height of the season, although not princely, are yet such that a very fair sum can be weekly earned by families who are industrious. The ruling rate now paid is ½d. per lb. of cotton. This rate places it within the reach of any active juvenile to earn from 3s. to 4s. per day without much effort. I have within my memory an instance of a widow and family of four children earning up to £1 per day at this occupation. This family came to our neighbourhood from Brisbane, quite new to country life, and acquired a very useful sum of money before the end of the season. Admitting, for argument sake, this to be much over average earnings, still, bearing in mind that each hand, if over twelve years of age, is able to gather from 50 to 100 lb. per day, this at ½d. per lb. is a very good wage earned.

Thus, what to do with our boys and girls by way of obtaining a livelihood is, to this extent, solved. It may be objected to that, as this avocation only lasts for some few months, it is for this reason not a suitable one, especially for families. To this I would answer that this fertile land of ours has other advantages to offer, such as poultry-keeping, bee-keeping, vegetable and small fruit gardening, which in themselves would comfortably sustain a family between times if industriously carried on.

It is of some importance in the study of this question of the unemployed to refer to the returns supplied by the Relief Officer at the Immigration Depôt, Brisbane, for the month of April, 1906.

Cannot something be done to adjust the difficulty of finding employment for those dependent on State bounty? Their services can be profitably used in cotton-picking, and, if available, would remove much apprehension from the minds of cotton-planters as to a sufficient supply of suitable labour. Herewith are the statistics referred to, and they supply much food for reflection:—

GOVERNMENT RELIEF ADMINISTERED AT BRISBANE DURING APRIL, 1906.

No. of Families.	Able-bodied Men.	Wives of Able-bodied Men.	Aged and Sick Men.	Wives of Aged and Sick Men.	Widows.	Deserted Women.	Wives of Men Temporarily Absent.	TOTALS.		
								Adults.	Children.	Souls.
617	70	56	182	170	195	68	102	738	1,549	2,287

Moreover, there are large numbers of adult males and females, who are often on the verge of penury, who refrain from making these demands for State assistance, but who would be available for work. Hundreds of our factory boys and girls are working for far less wages than can be earned at cotton-picking. Their weekly earnings do not exceed from 3s. to 6s. per week in factories.

My purpose in adducing these facts is chiefly to controvert an erroneous impression prevailing that this industry is likely to be adversely affected by want of suitable labour, and that the profits of those engaging therein are not sufficiently remunerative. I am prepared to grant that a very large and rapid increase under cultivation would embarrass growers, but for some years to come this labour question is not likely to be acute; and, when it is realised that every active picker employed can gather the cotton of between 6 and 7 acres, cotton-growing, by reason of its easy nature, is more likely to attract to itself suitable labour than any other form of husbandry.

THE ECONOMIC ASPECT OF THE LABOUR QUESTION,

as regards cotton production, is one often discussed. It is frequently contended that cotton is a black labour crop, and the belief is strongly held in some quarters that black labour is essential to success. America is quoted to prove this point. However much the industry in the country may have been indebted to the negro in the past, the present popular opinion is much to his discredit, as the following expressions, quoted from the "Florida Agriculturist" of February, 1906, will indicate. Cotton has always been grown in Russia, the Mediterranean islands, and a large quantity of the American crop is now being cultivated by other than black labour. These extracts from reliable American sources speak for themselves on this point:—

"The first experiment with Italian labour in the cotton fields of the South was made a few years ago in the delta section of Mississippi, and it proved to be such an unqualified success that there is now a great demand for this labour, and the cotton-growers are doing everything they can to secure it in place of the native negroes, who have become utterly unreliable, frequently deserting their employment before the crop is half made. The earnest and active efforts the planters of the South are now making to settle families of industrious Italians on their plantations promise to result eventually in the total disappearance of negroes from the cotton fields of the South. Col. Alfred A. Stone, one of the largest cotton-growers of Mississippi, recently read a paper before the American Economic Association showing some interesting facts regarding the increase of white labour in the South and what the negroes have to fear from competition with it. Directing attention to the case of the great Sunnyside Plantation, in

Arkansas, which at one time employed negro labour exclusively, he said that when the present operators of the plantation took charge of it in 1899 they accepted such labour as they found on it, consisting of thirty-eight Italian families with 200 working hands, and 203 negro families with 600 working hands. The Italians were cultivating 1,200 acres of cotton, and the negroes 2,600 acres. At the end of 1905, according to Col. Stone, the Italians numbered 107 squads with 500 working hands, while the negroes numbered only 38 squads with 175 working hands, and the acreage cultivated by the Italians had increased to 3,000, while that cultivated by the negroes had decreased to 900 acres. Moreover, the Italians were raising an average of 403 lb. of lint per acre and of 2,584 lb. per hand, while the negroes were averaging 233 lb. per acre and 1,174 lb. per hand.

"Of the 110 Italian squads that started to work in 1905, says Col. Stone, 44 were new arrivals. Yet, of the total number, 65 squads, or 59 per cent., contracted no debt for supplies during 1905; that is to say, practically all who made crops in 1904 were independent in 1905. Of the 61 negro squads that began crops in 1905, only 2, or 3·2 per cent. of the whole, were independent. We learn, further, that at the end of 1905 there were at work 107 Italian squads. One hundred and four of these own 123 head of work stock, which, with other live stock, such as cattle, sheep, and hogs, represent a money value of 2,000 dollars. Only 3 squads have no stock of any kind. Of the 38 negro squads on the place at the close of 1905, 21 own work and live stock to the value of 3,360 dollars, while 17 own no stock at all. This indicates not only a failure to take proper advantage of their opportunities upon the part of the negroes as a whole, but a grossly unequal distribution of property as well. Of 107 Italians but 2·8 per cent. have no share in the general wealth; of 38 negroes, 47 per cent. have no such share. A further impressive comparison is made as follows:—110 Italian squads began crops in 1905, and 107 carried them through; 1 left because of sickness, 1 ran off, and 1 was made to leave. Sixty-one negro squads began the year, and 38 went through; 17 "turned back" their crops, and 6 ran off. Of the Italians, 97·2 per cent. stayed through the year; of the negroes, 62·2 per cent.

"When we consider the infinitely better showing made by the Italians as compared with the showing of the negro field hands, it is not surprising that the planters of the South should use all the means in their power to secure Italians to work the crops, because this kind of labour is no longer an experiment. The Italian, as a labourer in the cotton field, has proved himself to be the superior of the negro in every respect, because the negro will neither work regularly nor work to his full capacity. The Italian labourer has also proved to be more trustworthy, more efficient, and more reliable. He produces more from the same amount of ground than the negro will produce, as Col. Stone's figures clearly demonstrate. Therefore, we are not surprised to hear that the planters of Mississippi and other Southern States have agents in New York who are employing able-bodied emigrants, whole families of them, as soon as they land from the ship, and providing them with railroad transportation to the plantations where their labour is so much in demand and has proved so satisfactory.

"The good results following the employment of Italians in the cotton fields of Mississippi have been made known elsewhere, and now Georgia, Alabama, and South Carolina are active bidders for Italian immigration, and so is Texas. The 'Houston Post' declares that negro labour no longer being reliable the farmers have almost entirely ceased to employ negro labour, and adds, 'In Texas three-fourths of the cotton is already produced by white labour, and white agricultural labour is becoming more and more in demand in other sections of the South.'"

I think these data completely refute the assertion that cotton-growing cannot be a success save in conjunction with black labour. As far as the States of our Commonwealth are concerned, there is a sufficient class of the labour needed in superfluity in every city of the Federation. Basing the prospective

needs of Queensland in this regard on the figures given by the Government relief agencies, which leave out a very considerable number who are in receipt of private benefactions, there is now in sight sufficient labour to control the picking of at least 5,000 acres of cotton, taking only into account the labour of those accepting support from the State, leaving out the unemployed in centres of population other than Brisbane, which would very much increase this calculation. The Salvation Army authorities and officials of other institutions state that an occupation such as is here under consideration would help them materially in establishing in useful work the numbers of adults and juveniles who are always in quest of something to do.

The cultivation being simple, the shrub hardy, defying more than any other crop our climatic vicissitudes, thriving remarkably well in all parts of our State, with an ever-increasing local and foreign demand, it should speedily become once again one of the leading industries of Queensland.

CAN WE GROW TOBACCO PROFITABLY?

By R. S. NEVILL.

The question is often asked if tobacco-growing pays, and the answer is: If grown in soil and climate that is suitable it does pay, and probably better than any other one crop; but if these conditions are not favourable the venture will not be satisfactory.

It is no evidence that good tobacco can be grown in a district because it is found growing wild, as it will grow anywhere like any other weed; but climatic conditions are so necessary to the production of a good quality that it is best to grow only a few plants as a test before attempting it along commercial lines. Heavy forcing soils will not produce good tobacco, and good results are not usually obtained from soils that are cloddy.

Cigar leaf is especially profitable, as has been shown by the few acres that have been grown in this State the past year. On the Upper Coomera last year there was grown 4 acres of cigar leaf, which gave a yield of a fraction over 3 tons, and average to the grower about £70 to the acre. These figures cannot always be realised, as a bonus of 1d. and 2d. per lb. was paid to induce the farmers to undertake it, but prices that would show a good profit may be expected; even at 7½d., three-fourths of a ton would bring £52 10s. per acre, and three-fourths of a ton per acre is not an unusual crop for cigar tobacco. At present the demand is somewhat limited, but we hope that the demand will keep pace with production, and, if our cigar leaf finds favour with English manufacturers, the demand will be a large one. I feel assured that it will find such favour if our farmers will take the care necessary to insure the very best results.

To grow, cure, and properly handle tobacco takes experience. It is not a crop that can ordinarily be made successful by inexperienced growers, and when instructions are available they should be followed implicitly, for nothing immaterial is given. Then best results will come in time, and we should then reap a golden harvest. There is not much hard work in tobacco-growing, but there is a great deal of patient work required. Much of this work can be done by children, twelve to sixteen years old; and this enables men of family to produce it cheaply, and thus realise larger profits.

IMPROVING THE TOBACCO PLANT.

By R. S. NEVILL.

Some time since I called attention in the "Journal" to the experiments of Dr. Trobut upon the selection and improvement of tobacco by means of seed selection. I now wish to call the attention of growers to the further work being done by the United States Department of Agriculture, where it is declared, and, they say, shown, that by a careful selection of seed the plants are not only

hardier, but produce better tobacco, and more of it, besides being less subject to disease. What is mentioned as "calico" disease is also known as "French," and is very prevalent in this State. It is recognised by the pied appearance of the leaves.

TOBACCO SEED SEPARATION.

Concerning the investigations of the Connecticut Agricultural Experiment Station in a tobacco seed separation, A. D. Shamel, of the United States Department of Agriculture, writes to the "New England Homestead":—

"There is a great difference in the size and weight of individual tobacco seed. The results of our experiments in Connecticut and elsewhere have proved conclusively that the large and heavy tobacco seed produced the best plants, while plants raised from the light seed were greatly inferior in size, yield, and quality. The heavy seed were a little slower in germination than the light seed, but made a much more rapid growth after germination, and produced the earliest maturing plants.

"The heavy seed resulted in more uniform plants than the light seed. The latter produced many so-called freak plants, bearing large suckers, and frequently branching out into worthless plants resembling earlier and unimproved types of tobacco. In fact, the plants raised from the heavy seed produced almost double the yield of the tobacco raised from the light.

"Plants raised from light seed were much more subject to disease than those grown from the heavy seed. This observation is particularly true of the mosaic or calico disease. This disease is due to faulty nutrition, and it seems that the vigorous growing plants raised from the heavy seed are not so liable to its attacks as the weaker plants grown from the light and immature seed. This fact has been clearly observed in the Connecticut Valley last season, where fields grown from the heavy seed were practically free from calico plants, while fields raised from seed which had not been separated contained from 25 to 65 per cent. of calico plants."

They have invented a machine for separating the strongly vital seeds from those less so, but, in the absence of such, it can be done by placing the seed in water, and the seed best to be sown will sink to the bottom. After standing two or three hours, pour off those floating on the top, and sow only such as have sunk to the bottom.

The Department is also endeavouring to develop a suckerless tobacco, as will be seen by the following extract, and it is sincerely to be hoped that they will succeed:—

"SUCKERLESS" TOBACCO SOUGHT FOR BY BUREAU OF PLANT INDUSTRY.

W. W. Cobey, a tobacco expert of the Bureau of Plant Industry, in a recent interview in the "Louisville (Ky.) Times," outlined the bureau's efforts to secure a tobacco free from suckers in the following statement:—

"Our method of developing sucker-resistant strains is simply one of pure selection. We select the plants in the field which show the greatest resistance to the sucker habit, and save the seed of these plants, free from cross-pollination, for planting the following year. We save the seed of each individual selected plant separately, and plant them in separate rows the next season, and select our plants for further breeding from those rows which show the greatest sucker resistance, selecting, of course, in every case, well-developed plants, which are comparatively free of suckers, and, wherever we can find a plant producing no suckers at all, of course this one is selected as the parent plant for breeding purposes.

"By following this method of careful seed selection and making very close and detailed observation, year after year, it seems to be possible to develop a type of tobacco in the course of two or three years which will produce very few suckers, and at the same time will give a larger growth of leaf surface and a larger number of leaves. In this way we are enabled to improve the quality and increase the yield of most varieties of tobacco."

TOBACCO CULTURE.

[Extract from a Bulletin issued by the United States Department of Agriculture.]

CUTTING.

The passage of the various constituents of a plant from one part of it to another, as the plant advances to maturity, is a capital fact common to all plants, and we see in fact that the oldest leaves gradually wither and die as they give up to the newer parts of the plant many of the matters that were contained in their cells. There comes a time when the plant ceases to draw food from the air and from the soil, and devotes itself to the purpose of concentrating the nourishment that was previously scattered through all its parts. At this period the leaves begin to change colour, light yellow spots appear upon them, and the leaf or plant is said to be ripe and ready to be cut. As the leaves ripen from the bottom upward, the rational system is to pick or prime the tobacco as the leaves ripen. This is done in the Bright tobacco district, and to some extent in the cigar districts of Florida. In the other districts, including the cigar districts of the North and manufacturing and export tobacco districts, the plant is cut when the middle leaves are about ripe. If the plant is not fully matured at the time of cutting, it is liable to cure dark, or if the weather happens to be dry or cold, so that it dries out quickly, it will cure green, and be worthless.

The time when a plant is ripe and ready to be cut is a matter of judgment and experience. There is a slight change in the colour of the leaf, perceptible in looking over a field of tobacco, which shows the experienced grower that it is ready to be cut. When the leaf is observed to change colour from a rank green to a lighter shade of green, and yellow spots appear, it is a certain indication that the constituents of the leaf have performed their duty and are going back to the stalk to be carried to the upper leaves or to be used for other purposes in the economy of the plant.

Another test of this is to fold the leaf between the fingers, and if the leaf snaps or retains a crease where it was folded it is said to be ripe.

A plant that is topped low, with only 8 or 10 leaves, will mature more uniformly, of course, than one that is topped high, like the Sumatra, where 18 or 20 leaves are left on the plant.

Cutting or priming should not be done when dew or rain is on the plant, as it is liable to leave black spots on the cured leaf. In the South, cutting is not done until late afternoon in midsummer, as the midday sun is liable to sunburn the tobacco in a few moments.

Where priming is done, the leaves are placed in baskets or shallow boxes to be carried to the drying sheds, where they are strung on twine or on wires. The leaves are put face to face and back to back, 30 to 50 to a string, according to the size of the leaf. The twine or wire is then stretched on a 4-foot lath with a slit about 2 inches long sawn in each end, and hung in its place in the barn. In harvesting plants they will not all be ready to be cut at the same time, and it is necessary to go over the field a number of times, and cut them only as they ripen.

Where the whole plant is cut it is allowed to wilt for several hours before being carried to the barn to prevent breaking the turgid leaves. Plants are cut and laid in rows on the ground to wilt, several rows being laid in one for convenience in handling. With the finer grades of cigar wrapper the plant is not allowed to lie on the ground directly, and in many localities the wilting is done after the plant is put on laths, upon which it is to be hung in the barn, and the laths supported on small trestles in the field or in racks arranged for the purpose. When sufficiently wilted, the tobacco is hauled to the barn, either on racks made for the purpose or carefully piled on the wagon bed. In hanging the tobacco the butts are either pierced with an iron-pointed lath, or the stalk is split all the way up, and the plants strung on the laths in this way. Before being hung up, care should be taken to remove all eggs and worms from the

leaves, as the eggs are liable to hatch, and the worms do great injury to the leaves while hanging in the barn. All the suckers should also be removed, or they will continue to grow and absorb the nourishment of the full-grown leaves.

In Cuba and Southern Florida the plant is cut in sections in the field. The three top leaves, usually the finest wrappers, are cut in one section; the rest of the stalk is cut in sections of two each. Two rows are taken at a time, and the sections are assorted according to their grade and position on the plant. The field is gone over several times, until all the ripe plants have been cut. Boys accompany the experts, and receive the sections on their arms, the stems being turned alternately to prevent the loads from falling. When a turn has been received, the boys slide the sections on to poles placed on forked stakes at convenient places in the field. These poles, when full, are carried to the barn. The Cubans use long poles, usually 13 feet in length. This system has the advantage of sorting the tobacco as it goes into the barn. As the curing progresses in the barn, the leaves are separated more and more for a better circulation of air.

Cut tobacco must not be left exposed to the sun and wind, especially when lying on the ground in small piles. It must be hauled to the wilting sheds or barns as soon as the leaves are sufficiently wilted to avoid being broken in handling.

Where priming is practised, the leaves should be left to mature further than where the entire stalk is cut, for while the stalk is hanging in the barn a translocation of the matters from the stalk to the leaves takes place, and from the leaf to the stalk; and the leaf ages and matures, therefore, while hanging in the barn. When the leaf is once severed from the stalk, however, in the process of priming or cutting in sections, there is no opportunity for this transfer, except to the very small portion of stalk which is left on the section.

SAVING SEED.

The grower should maintain and even improve the quality of his crop by a judicious selection of seed plants. To this end, the field is gone over several times during the growing season, and typical plants picked out possessing the greatest possible number of good points. After finally deciding upon the plants which should be saved for seed, these are allowed to grow to full maturity without removing the seed head when the rest of the field is topped. As the seeds of a plant are produced from the food material prepared in the leaves, the leaves should be left upon the seed plant until the seed is ripe. It is advisable also to have plants close together, in order that they may fertilise each other by the exchange of their pollen. Only the central spike of the plant should be left for seed, the suckers being removed as they develop, in order that all the nourishment taken up by the plant should go into the central spike to make heavy seed.

The largest pods will contain the heaviest seed, and these should be selected for planting. "Hellriegel found that the weight of the seed sown had, under some circumstances, considerable influence on the yield of the crop, and that the young plants from the overripe seed were decidedly the strongest and most vigorous, the others being smaller and feebler, very much in proportion as the seed from which they grew had been gathered earlier." The heavier seeds can be separated from the light by winnowing in a light wind or by screening. Seed plants of different varieties should be separated as far as possible to prevent crossing through the intervention of insects, air currents, &c. Exchanging and mixing seed of the same variety grown some miles distant is good practice, as it tends to make the seed and plants more vigorous.

A great deal of the trouble arises in attempting to maintain a fair strain of tobacco seed on account of the facility with which cross-fertilisation occurs in the field. For this reason the recent experiments of Dr. Doroxie, editor of the "Hungarian Tobacco Gazette," of Budapest, mentioned by Killebrew and Myrick in "Tobacco Leaf," are of great interest. This gentleman "has propagated

tobacco from slips, and claims that the leaves harvested from such propagated plants are finer and of higher quality than those of the mother plant."

The suckers from the plants are easily propagated in a suitable seed bed, just as slips of any of the ordinary flower plants, such as geranium or coleus. They can be readily grown to maturity in the field or in the hothouse, and the seeds so obtained will actually represent the parent without change from cross-fertilisation from other plants if care is taken.

It seems probable that, by continuously raising seed from suckers instead of from seed, Havana or other superior kinds of tobacco can be acclimated in the Northern States, and retain the qualities of the first year's crop, just as original qualities are retained by layering and grafting fruit.

Tobacco seed will retain its vitality for ten or twenty years, but it must be remembered that as a general rule all seeds begin to lose their vitality from the movement of ripeness. The process of deterioration with tobacco seed goes on, and on each succeeding year a less numbr of seeds will sprout, until finally all lose their germinating power. In planting old seed they should be first tested, and the quality sown should be proportional to the vitality of the seed.

Times of Sunrise and Sunset, 1906.

Date.	May.		June.		July.		August.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·14	5·16	6·32	5·0	6·40	5·4	6·30	5·18
2	6·14	5·15	6·32	5·0	6·40	5·4	6·29	5·18
3	6·15	5·14	6·32	5·0	6·40	5·4	6·29	5·19
4	6·15	5·13	6·32	5·0	6·40	5·5	6·28	5·19
5	6·16	5·13	6·33	5·0	6·40	5·5	6·28	5·20
6	6·17	5·12	6·33	5·0	6·40	5·5	6·27	5·20
7	6·17	5·12	6·34	5·0	6·40	5·6	6·27	5·21
8	6·18	5·11	6·34	5·0	6·39	5·6	6·26	5·22
9	6·18	5·11	6·35	4·59	0·39	5·6	6·25	5·23
10	6·19	5·10	6·35	4·59	6·39	5·7	6·24	5·24
11	6·19	5·10	6·35	4·59	6·39	5·7	6·23	5·24
12	6·20	5·9	6·35	4·59	6·39	5·7	6·22	5·25
13	6·20	5·8	6·36	5·0	6·39	5·8	6·21	5·25
14	6·21	5·8	6 36	5·0	6·39	5·8	6·20	5·26
15	6·21	5·7	6·36	5·0	6·38	5·9	6·19	5·26
16	6·22	5·7	6·36	5·0	6·38	5·9	6·18	5·26
17	6·23	5·6	6·36	5·0	6·38	5·10	6·17	5·27
18	6·23	5·6	6·36	5·1	6·37	5·10	6·16	5·27
19	6·24	5·5	6·36	5·1	6·37	5·11	6·15	5·28
20	6·25	5·5	6·37	5·1	6 36	5·11	6·14	5·28
21	6·25	5·4	6·37	5·1	6·36	5·12	6·13	5·29
22	6·26	5·4	6·37	5·1	6·35	5·12	6 12	5·29
23	6·26	5·3	6·37	5·2	6·35	5·13	6·11	5·30
24	6·27	5·3	6·38	5·2	6·34	5·14	6·10	5·30
25	6·27	5·2	6·38	5·2	6·34	5·14	6·9	5·31
26	6·28	5·2	6·38	5·2	6·33	5·15	6·8	5·31
27	6·28	5·1	6·38	5·2	6·33	5·15	6·7	5·32
28	6·29	5·1	6·39	5·2	6·32	5·16	6·6	5·32
29	6·30	5·0	6·39	5·3	6·32	5·16	6·5	5·32
30	6·31	5·0	6·39	5·3	6·31	5·17	6·4	5·33
31	6·31	5·0	...	...	6·31	5·17	6·4	5·33

Phases of the Moon.

			H.	M.
1 May	☾	First Quarter	5	6 p.m.
8 „	○	Full Moon	12	9 „
15 „	☽	Last Quarter	5	2 a.m.
23 „	●	New Moon	6	0 „
31 „	☾	First Quarter	4	23 „
6 June	○	Full Moon	7	11 p.m.
13 „	☽	Last Quarter	5	34 „
21 „	●	New Moon	9	5 „
29 „	☾	First Quarter	12	18 „
6 July	○	Full Moon	2	27 a.m.
13 „	☽	Last Quarter	8	12 „
21 „	●	New Moon	10	59 „
28 „	☾	First Quarter	5	56 p.m.
4 Aug.	○	Full Moon	10	59 a.m.
12 „	☽	Last Quarter	0	47 „
19 „	●	New Moon	11	27 p.m.
26 „	☾	First Quarter	10	42 „

The approximate times for sunrise and sunset at Rockhampton, Townsville, and Cooktown may be obtained by *using the table for Brisbane, and adding* the following figures:—

1906.	Rockhampton.		Townsville.		Cooktown.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.
May	2 m.	18 m.	13 m.	41 m.	12 m.	50 m.
June	1 m.	19 m.	10 m.	44 m.	7 m.	55 m.
July	2 m.	18 m.	10 m.	44 m.	9 m.	53 m.
August	5 m.	15 m.	18 m.	36 m.	16 m.	46 m.

By an oversight, the tables of the phases of the Moon, Sunset and Sunrise, were incorrectly given in the issues of the Journal for March and May.

Neglected Industries.

ESPARTO GRASS OR ATOCHA.

Last month we made reference to the value of esparto grass as a material for paper-making in lieu of rags. From what we can gather concerning this grass, it would seem especially adapted for a hot, dry climate, whether on the coast or in the interior. Any argillaceous soils impregnated with nitrous matter or saltpetre are favourable to the production of a strong fibre. We take the following notes on esparto grass from Bernays' "Cultural Industries for Queensland":—

It is only comparatively of late years that this remarkable grass, which now forms an important staple of commerce, has come into prominent notice. Long known among the populations of the countries to which it is indigenous for the great strength of its fibre, which rendered it invaluable for a hundred uses, it was laughed at by the paper-makers when first suggested as a substitute for rags in that huge industry. The manufacture of paper, however, increased so rapidly that the supply of rags fell far short of the demand, and manufacturers, forced to seek for other raw material of which the supply should be practically without limit, and which was readily reducible, found it, after all, in the esparto grass, at which they had sneered when it was first proposed to them.

"Thus," says a writer, thirteen years ago, "after 200 years of experiment, and the trial of a thousand different substances, just when the civilised world feels its necessity the most, a perfect substitute for rags has been found, and will be used wherever a book is read and the art of writing known." So advanced are the processes now by which it is converted that it has been claimed that a cargo arriving in London in the morning has been converted into paper before night.

The plant is a native of Spain and of Southern Africa. "A portion of the Sahara," says the celebrated German traveller, Dr. Gerhard Rohlfs, "known as the little desert, comes within the influence of moisture-laden winds and is clothed with vegetation. One of the most useful plants covering the whole district is 'esparto.' Long known and utilised for mat-making, it is only of late years that the true value of this plant, which requires neither care nor culture, and thrives with a minimum of moisture, has been recognised."

The word "sparto" or "esparto" has its origin in "spartum," the name given by the Latins to a fibre held in great esteem for the manufacture of cordage, &c.; and by some the two are supposed to be identical. Dr. Forbes Royle, however, thinks it probable that in the "spartum" of the Romans was included both what are now known as "esparto grass" and "spartium junceum"—the sunn hemp; the term being used as a generic name in much the same way as "hemp" is now-a-days applied alike to the products of wholly different plants. It is also supposed to be the "rush of a dry soil" referred to by Pliny.

Dr. Schomburghk states that it grows on the poorest soil, especially limestone and sand—in fact, that where nothing else will grow esparto grass will flourish. This plant, however, like all others which will grow in poor soils, has its congenial conditions under which it thrives best, and which will evolve most fully those qualities which give it its commercial value. It is rarely seen above 3,500 feet of elevation—in fact, when the snow commences esparto ceases to grow.

The United States Consul at Adra, Mr. Frederick Burr, who has studied the habits of the plant in Spain, and reported exhaustively to his Government on the subject, says:—"Calcareous soils are considered to produce good esparto

and of very strong fibre. Argillaceous soils, whether those produced by the decomposition of shaly rocks or those formed by the wide deposition of tertiary marls, are impregnated with nitrous matter or saltpetre, and are considered favourable to the growth of the esparto, the grass being shorter but the fibre stronger.

"The leading facts in the production of esparto may be stated as follows:—(1) The atocha grass requires a decidedly hot and a somewhat dry climate. (2) That it grows equally well in the plains of the coast and the interior, and in the mountains, but is strictly limited to a certain moderate elevation. (3) That it flourishes equally both in calcareous and argillaceous soils, and in those soils where both calcareous and argillaceous matters are naturally blended. That, besides several soils which may be considered unfavourable, there seem to be others which are decidedly inimical to its growth."

To show how strongly the conservation of this valuable plant is urged in France, the following extract is given from the journal "L'Exploration":— "As in France laws have been made against the falling and destruction of forests, so must the Colonial Government concern itself with the protection of this great staple of the high plateau, and severely punish the burning by the Arabs and killing of the plants by careless gathering. It must not be lost sight of that all Europe and America are dependent on Algeria, and that, should the whole esparto district be carelessly left to greedy robbers, who care little for the public property, nothing will at last remain but a neglected waste."

As a fodder it possesses little value, Dr. Rohlfs stating that it has a powerfully constipative effect, and that the shepherds on the edge of the desert drive their flocks every third or fourth day to drink at mineral springs to counteract the binding action of the esparto feed. Camels and sheep soon tire of it.

The plant grows in thick bunches close together, with a broad base, tapering to the top, and attains a height of from 6 to 10 feet. In the cylindrical form of its stalk it resembles a rush. In harvesting it is pulled instead of being cut. If this is not done carefully the roots are disturbed, with the consequence of great waste. Indeed, in the African coast district the plant is torn up by the roots, and so sent to market, a method analogous to killing the goose that lays the golden egg. This rough method really involves more labour than is necessary, as if gathered at the proper season—viz., just at maturity—the leaves part from the socket without difficulty, and the root is left undisturbed for another crop. By the other method the operator protects hands and legs with gloves and boots, and then twists the stem round a stick in order to obtain a better purchase, even with the aid of which the gathering is very hard work. If gathered green, it makes a transparent fibre of little value; if too dry, the constituent elements of silica and iron are difficult to remove. That grown on the sea coast is the best.

The preparation of the crop for the paper-mill is the simplest possible proceeding, the grass being dried in the sun just like hay, and then tied into convenient bundles and conveyed to the nearest shipping port. Although of a dry and wiry nature, it loses about one-fourth of its weight in drying.

"The quantity of esparto produced from a given extent of land," says Mr. Consul Burr, "will vary greatly, the grass being in some places very luxuriant and abundant, while in others, where the soil is less congenial, it is more thinly dispersed in tufts and patches. This grass seems to last for an unknown number of years, so that where it has taken possession of the soil it becomes a perpetual growth. Thus in any soil congenial to its growth the 'atocha' is self-propagating, and without further cultivation or attention of any sort it furnishes a never-ending annual crop of esparto. All persons with whom I have spoken agree that the esparto improves by a regular yearly

gathering, and that the plant is found to become stronger in consequence. But the gathering requires some little care. The grass (which readily separates) must be plucked up, but without pulling up or injuring the roots. If the roots be disturbed, as may be the case, by careless or ignorant people, or those who greedily seek to increase their wages by puliing up the entire plant, thus augmenting the apparent weight of esparto gathered, the atocha is destroyed, and no more grass will be gathered on that spot."

When harvested by the native population in Spain for conversion into the various articles for which it is largely used, the process of preparation is different. After gathering, the grass is left in a heap for two days. On the third it is spread out and exposed to the heat of the sun until dry; then remade into bundles and macerated in water, salt water being preferred. It is once more dried, again wetted, and is finally beaten before it is ready for use.

The quantity of esparto grass available in the wild state would be practically illimitable, were the labour of the native population more reliable and their method of gathering better calculated to send the article to market in a form requiring a minimum of treating by the manufacturer. It yields to the paper-maker nearly as much pulp as average rags yield, is no more difficult than rags to work up, and in many respects is preferred to them. But to compete with rags upon even terms it must come to the manufacturer in a state requiring no additional stage of labour before it is ready to undergo the first operation towards reduction to pulp. Dr. Rohlfs is of opinion that this plant is an inexhaustible source of wealth to all Northern Africa. In Algeria alone there exist some 7,000,000 or 8,000,000 acres of esparto. The greater part of the produce of Spain and Africa goes to England, but the Americans are beginning to import for themselves direct from Africa. Tunis, Tripoli, Cyrenaica, and the Libyan coast plateau stretching to Alexandria, all export esparto; but the frequently disturbed condition of these countries renders the supply uncertain, so that Spain and Algeria enjoy almost a monopoly.

In 1879—the most recent date of statistics that I can find—the total imports of esparto and other vegetable fibres into London reached 162,000 tons; but this enormous quantity, of which the miscellaneous fibres, other than esparto, formed a very small proportion, fell short of the demand. Prices ranged from £6 10s. to £7 10s. for Algerian, to from £9 12s. to £10 7s. for Spanish.

Dr. Schomburghk, one of the most eminent authorities upon industrial botany in Australia, expresses the opinion that by the cultivation of esparto grass many thousand acres of arid land, scarcely fit for pasture, might be rendered productive districts. The plant is as easily cultivated as rice or hay. It is of rather slow growth, but, although inhabiting poor and arid soils, the experience of Spanish growers shows that a soil of good depth and moderate moisture gives a stronger and healthier plant in less time. It is raised from seed or by division of the plants. There appears to be some dificulty about the seed. A small quantity obligingly placed at the writer's disposal by Dr. Schomburghk, and handed to Mr. Pink, of the Botanic Gardens here, did not germinate. Messrs. Vilmorin, Andreux, and Co., of Paris, writing to the Agricultural Department of the United States in 1868, speak on this point in these terms:—

"As we told you in our former letter, seed of this plant is not in commerce. Many times we tried to procure it both in Spain and in Algeria, but always were informed that it does not yield fertile seed, and was propagated only by division of the old plants some way similar to the propagation of the sugar-cane, and it is by a mere chance that we have got the seed we have forwarded to you. A friend of ours, when in Spain some ten or twelve years ago, cut some of the flower stems of the esparto grass, and on his return to

France tried to sow the seeds he found in these specimens, and a very few did grow. He cultivated carefully the young plants, but all the seeds he could collect remained sterile; he at last tried artificial fecundation, and succeeded this year to a certain extent. In continuing the experiment he has been able to collect the seeds we have got this year."

The seeds should be sown broadcast, and if they come up too thickly the thinnings can be planted out and will grow readily. Subdivision of the roots requires no special directions—it is as easy in the case of this plant as in that of the guinea grass so familiar to many Queensland farmers. Whether grown from seed or subdivision, a foot apart is sufficient distance for the plants.

Esparto is now extensively planted in the South of France, and is said to pay well, yielding from 6 to 8 tons per acre. As the cultivation and preparation for market are most easy, climate congenial, an unlimited area of suitable land, and a constant and certain market available, there exists every inducement to the Queensland farmer to grow it as a crop, especially in cases where a mistake in selection has been made, and he finds himself saddled with land poorer than he believed it to be when taking it up.

The uses to which esparto grass is put in countries to which it is indigenous are, as I have said, very numerous, such as sacks, sheep nets, mattresses, shoes, and rustic clothing, baskets, matting, ropes of all sizes, and, when properly prepared, it is put to various fine purposes for which in other countries flax and hemp are used. It is also curled to imitate horse hair, for which purpose it is highly prized, being very durable.

Apart from the strength and elasticity of this fibre, it is claimed for it that it is free from liability to harbour vermin, and that it is not injured by constant exposure to moisture.

At one time in Spain, esparto was being largely used in the manufacture of a sort of sandal called "Alpergates," in which a large trade was carried on with the Indies. The peasants in many parts of Spain still hardly ever wear any other kind of shoe. It also enters largely into the manufacture of carpets in Scotland, England, and Brussels.

Another rush-leaved plant, "Lygeum Spartum," is also used and known as esparto by the Spaniards. The character of growth of this plant is different from that of "Stipa tenacissima." Having a creeping root-like stem, it would be apt to spread very rapidly, and if once rooted a few plants would soon take possession of a large tract of country.

In connection with the use of esparto as a paper-making material, it may be interesting to mention that the annual consumption of paper in different countries is estimated as follows, viz.:—England, 13¼ lb. per head; America, 12 lb.; Germany, 10 lb.; France, 8¾ lb.; Austria, 4½ lb.; and Russia, 1 lb.

AMALGAMATIONS OF ASSOCIATIONS.

It appears that in some parts of the State the farmers and fruit-growers are becoming alive to the many advantages to be derived from a fusion of forces. Wherever the interests of societies and progress associations are identical, or nearly so, it is being found that a union of several neighbouring societies is desirable. We have already pointed out how the interests of the farming industry of a district may be advanced by such an obviously advisable course, and are pleased to see that our suggestions are being acted upon. In the Caboolture and Mooloolah districts, we note that the Teutoberg, Peachester, Coochin Creek, and Mooloolah Progress Associations have united for general progressive work in Caboolture No. 1 Division; and it will be interesting to hear later on how the joining of the forces of the four associations has been found to work, although we have not the slightest doubt that the community of interests in these districts will prove a favourable factor in the movement. The general secretary is Mr. C. Court, Mooloolah.

Chemistry.

ELEMENTARY LESSONS ON THE CHEMISTRY OF THE FARM, DAIRY, AND HOUSEHOLD.

By J. C. BRÜNNICH, Agricultural Chemist.

TWELFTH LESSON.

MANURES OR FERTILISERS.—NECESSITY OF MANURING: GENERAL AND SPECIAL MANURES. NATURAL AND ARTIFICIAL MANURES. RELATIVE VALUE OF MANURES. FERTILISERS ACT OF 1905. MIXING OF MANURES.

In order to understand the principles of manuring, we must first make clear the differences which exist between **natural vegetation** and the vegetation produced by the **artificial cultivation** of agriculture.

The *natural vegetation* on land in its virgin state will not tend to impoverish the soil, because all the plant foods taken from the soil are again returned, already partially during the life of plants and animals growing and feeding on the land, and completely after their death by their decay. The surface soil at the same time becomes more and more enriched in soluble mineral plant foods, which are brought up by the plant roots from great depth, and the physical properties, chiefly due to the accumulation of humus, are very much improved. Dense natural vegetation also prevents the surface soil being washed away by heavy rains, and the humus again prevents the washing out of soluble plant foods. Our richest agricultural lands are generally obtained by the clearing of virgin scrubs.

As soon as land, be it forest or scrub land, is cleared and *brought under cultivation* the conditions are changed. The products of cultivation, as hay, straw, grain, tubers, fruit, &c., are taken off, the animals reared on the land are also entirely removed, or at least the products obtained from them in the form of milk, butter, cheese, wool, &c., are sold. In this manner plant foods are continually removed from the soil, which must lead to a gradual *diminution in its fertility*. The crops, as a natural consequence, not only become *smaller in quantity and quality*, but they are also, due to insufficient nourishment, more *liable to be affected by diseases* of all kind.

The **natural fertility** of virgin soils will vary in accordance to their origin and composition; some soils produce good crops for a long period, others show a rapid falling off after a few very good crops, and some again are from the very beginning already deficient in some constituents, so that they cannot produce certain crops, but may grow other crops fairly well.

The main object of **manuring** is to restore to the soil such constituents, which have been removed by cultivation or which have been naturally deficient in the soil.

A **reckless cultivation** without proper manuring from time to time leads to complete exhaustion of soils, which has become very apparent in many countries. Fortunately our comparatively young and rich soils have not, under our generally very favourable climatic conditions, shown much of the effects of such *careless cultivation*, which may be plainly called "*robbery*," and which has been hitherto with us more or less the common practice.

Agricultural science, with the help of careful **manuring experiments** carried out for a long number of years, has proved that soils may be kept highly productive, and poor soils may be improved and made more fertile by proper cultivation and good manuring. Many of our farmers have manured their lands, chiefly using crushed bones and bone meal, but without getting any apparent beneficial results, because they overlooked the important fact that a plant must have an adequate *supply of all* the substances required as plant foods, and that it is not sufficient to add only one constituent in the form of manure. The eminent chemist, Baron von Liebig, expressed this clearly in his "**Law of Minimum**":—"Every field contains a *maximum* of one or several, and a *minimum* of one or several nutritive substances. It is by the *minimum* that the crops are governed, be it lime, potash, nitrogen, phosphoric acid, magnesia, or

any other mineral constituent: it regulates and determines the amount or the continuance of the crop."

This important law does not only apply to the supply of mineral plant foods, but also to the other important factors of growth: *light, heat,* and *moisture.* The importance of moisture is often quite overlooked, or at least under-estimated, but will become very apparent by the statement that for the production of *every pound of dry substance* in a crop from *300 to 400 lb. of water* have to circulate through the plant, or that for the production of **one ton of hay** per acre at the very least **300 tons of water,** or 3 inches of rain, are necessary.

In accordance with their origin manures may be divided into *vegetable, animal,* and *mineral manures.* Again, we may divide them, in accordance how they are produced, into **natural** and **artificial manures.** A manure which contains all the substances removed from the soil by crops or animals may be called a **general manure,** whereas a manure which only supplies one or more of such constituents is called a **special manure.** Special manures, to suit certain crops or certain classes of soil, are generally sold in a concentrated and portable form as **fertilisers.** General and special manures are generally *direct acting,* as they supply all or some of the fertilising constituents in a more or less readily available form to the plants; another class of manures have also an important *indirect action,* like, for instance, lime and gypsum.

One of the most important natural manures is **farmyard** or **stable manure,** which must be considered a perfect general manure, and consists of the mixture of the solid excrements and urine of cattle, with straw or any other material used as litter. The chemical composition of the excreta, consisting of undigested parts of food and of waste materials, depends on various conditions, as quantity and quality of food, age and breed of animals, &c. A large amount of plant foods are found in the liquid part of the excreta, and very often goes to waste if not sufficient litter is provided to absorb all liquid matter. Both liquid and solid excreta rapidly undergo fermentation, which, if the manure is not properly treated may lead to *loss of nitrogenous matters,* the most valuable of all manurial constituents. *Litter* helps in the production of a good farmyard manure; it increases the bulk; makes the manure more porous; retains the liquid portion of the manure; produces humus, which again absorbs ammonia and other plant foods, which otherwise might be lost. Farmyard manure must be kept *moist,* as drying up, overheating, and mouldiness always leads to loss of nitrogen. Shallow layers of earth added from time to time as the manure heap is built up will help in preventing this loss.

To form a fair idea of the manurial value of the excreta of the different animals, and also of substances used as litter, I give herewith a table of the composition of these materials and also of human excrements:—

	PERCENTAGE OF—					
—	Water.	Organic Matters.	Nitrogen.	Total Ash.	Phosphoric Acid.	Total.
Horse dung	75·8	21	·44	3·2	·3	·4
Horse urine	90·0	7	1·5	3·0	...	1·6
Cow dung	83·5	14·6	·29	1·9	·2	·1
Cow urine	93·8	3·2	·6	3·0	...	1·3
Sheep dung	65·5	31·4	·6	3·1	·3	·2
Sheep urine	87·5	8	1·9	4·5	trace	2·3
Pig dung	79 to 84	10 to 15	·7	3 to 5	·1 to ·4	·3
Pig urine	97·5	1·5 to 2·8	·4	1 to 1·5	·1	·7 to ·8
Hen manure	59·7	29·4	·8 to 1·4	8·4	·5	·6
Litter—						
Straw (cereal)	12 to 21	75 to 83	·3 to ·9	3 to 8	·2 to ·3	·5 to 1·1
Straw (leguminous)	12 to 22	76 to 83	1·2 to 2·0	3 to 9	·3 to ·4	·6 to 1·8
Leaves	13 to 15	78 to 81	·8 to 1·4	4 to 6	·2 to ·3	·2 to ·4
Sawdust	32·5	62·3	·8 to 1·0	...	·05	·10
Tannery refuse	6·4	33·8	·2	...	·04	·08
Human excrements	77·2	13	1·0	3·0	1·10	·25
Human urine	95·9	4	·6	1·0	·17	·20
Human excrement and urine (mixed)	93	5·7	1·0	1·4	·23	·22

The best results are obtained from farmyard manure if it was made in a covered watertight pit. As a rule, well-rotted manure is of more value than the fresh manure, but sometimes it may be advisable to cart the fresh manure directly on to the land and to plough it under at once, more particularly in the case of light sandy soils. For the *fixing of nitrogen* various substances, as peat, charcoal, gypsum, kainit, superphosphate, sawdust saturated with sulphuric acid or with solution of green vitriol, are sometimes added to the manure heaps.

Farmyard manure is applied in quantities from 10 to 20 tons per acre, and the effects of such a dressing are spread over many years.

Farmyard manure is found to be of very great value when used in small quantities in addition to application of artificial fertilisers.

Other natural organic manures are:—

Guano, the dried dung of sea birds, which, deposited in dry rainless districts, contains from 7 to 11 per cent. of nitrogen and from 5 to 15 per cent. of phosphoric acid. In other localities, where rain or water washed soluble matters out, this manure contains only traces of nitrogen and up to 20 per cent. of phosphoric acid.

Bats' Guano, which is found in enormous quantities in some caves in Queensland, is composed of the dung and decaying remains of bats, and is also a nitrogenous phosphatic manure containing from ·5 to 5 per cent. of nitrogen and from 5 to 15 per cent. of phosphoric acid, with traces of potash.

Fish manure is made from the offal of fish, and contains from 3 to 5 per cent. of nitrogen and 3 to 8 per cent. of phosphoric acid.

Seaweeds are a cheap, valuable, and frequently neglected general manure, containing from ·3 to 1·0 per cent. of nitrogen, ·1 to ·5 per cent. of phosphoric acid, and ·5 to 2 per cent. of potash.

Wool waste (*shoddy*), **hair,** and other refuse from tanyards, have all considerable manurial value.

Nitrogenous manures, supplying nitrogen to the soil, are special manures, the most valuable of which is **nitrate of soda,** "*Chili saltpetre,*" containing up to 15·6 per cent. of nitrogen, in the most quickly available form of nitric acid combined with soda, as sodium nitrate—$NaNO_3$. It is a crystalline salt, very soluble in water and deliquescent in moist air. It is found in enormous deposits, more or less pure, in rainless countries on the east coast of South America, principally Chili, which alone exports annually over 1,000,000 tons.

It is a very quick-acting manure, which, however, as already explained in a previous lesson, is not retained or absorbed by the soil, but is liable to be washed away by heavy rains. For this reason nitrate of soda should be applied to crops, after they have made some growth, in the form of a top dressing, in quantities from ½ to 1 cwt. per acre. It is a very valuable manure for potatoes, mangels, corn, oats, and wheat; but if used in too large a quantity for the last two crops it may tend to produce too much straw and little grain.

Nitrate of soda, like all other special nitrogenous manures, will only yield the best results if the soil contains a sufficiency of the other necessary plant foods. Nitrate of soda seems more especially suited for clay lands.

Sulphate of ammonia, $(NH_4)_2SO_4$, is, as already fully explained in a previous lecture, the valuable by-product of gasworks, as it is manufactured from the ammoniacal liquor. It is generally sold in the form of a white crystalline powder, which contains about 20 per cent. of nitrogen, or about one-third more than nitrate of soda, which, however, is not in such an available form, as only some time after application, and under favourable conditions, the ammonia salts are changed into nitrates by the process of *nitrification.* The great advantage which ammonium sulphate possesses, as compared with sodium nitrate, is that the salt is readily retained and absorbed by the soil, and is not liable to be washed away. This special nitrogenous manure may be used for any class of soil, but on lands containing little or no lime the manure cannot produce any results, because the process of nitrification requires lime salts;

again, on lands too rich in lime, as chalky soils, this manure should not be used, as loss of nitrogen by volatilisation may take place.

Ammonium salts applied as manures will increase the amounts of carbohydrates and sugars in crops, whereas as nitrates seem to produce more albuminoids. Sulphate of ammonia may be applied before or at the time of sowing, and may be used in quantities up to 1½ cwt. per acre.

Nitrate of Potash, saltpetre, KNO_3, which contains 13·8 per cent. of nitrogen and 46·5 per cent. of potash, is generally too dear to be extensively used as manure; it is very good for tobacco, and is often used for flowers, ferns, pot plants, by watering them with a dilute solution containing from ¼-oz. to ½-oz. of saltpetre per gallon.

Dried blood, a by-product of slaughter-houses and meatworks, is a very valuable nitrogenous manure, containing from 6 to 12 per cent., or as an average about 10 per cent. of nitrogen, chiefly in organic form, which, by nitrification, is rapidly decomposed into nitrates. It is of particular benefit as a top dressing to grass, and has also given excellent results with wheat.

Soot, which is also used as a top dressing for grass land, wheat, and other crops, owes its value to the small amount of nitrogen, in average about 2 per cent., it contains.

Meatworks manure, another by-product of meatworks, contains, as a rule, up to 6 per cent. of nitrogen, and up to 25 per cent. of phosphoric acid.

Oil cake, the refuse left after extracting the oil from various seed, is only sometimes used as a manure, as this residue is generally too valuable a food for cattle. Only some cakes, like castor oil cake, which are not fit for food, are used as manure. Oil cakes contain from 4 to 6 per cent. of nitrogen, from 1½ to 3 per cent. of phosphoric acid, and up to 1½ per cent. of potash.

Potash manures.—The use of these special manures supplying potash to the crops, are frequently quite overlooked by our farmers, and this is the reason that the application of nitrogenous and phosphatic manures alone gives frequently very poor results. Many crops, like potatoes, leguminous crops, and most vegetables, benefit particularly by potash manures.

Wood ashes, and the ashes of many plants, used to be, in olden time, the chief source of potash, and should still be used when available for manuring purposes. Bloodwood, red gum, grass-trees, give ashes particularly rich in potash, containing up to 5½ per cent. The ashes contain also phosphoric acid and large amounts of lime.

Potassium sulphate and **kainite** are at present the principal commercial potash manures, and are, as already fully explained, obtained in large quantities from the deposits at Stanforth.

Kainite is a double salt of potassium sulphate and magnesium chloride and sulphate, and contains in average about 12·4 per cent. of potash. *Potassium sulphate*, K_2SO_4, contains about 52 per cent. of potash on a *potassium chloride* or muriate, KCe, about 58 per cent. of potash. The best results are obtained when potash salts are applied in connection with nitrogenous and phosphatic manures, and for this reason potash salts form nearly always part of the most important general manure mixtures. Potash manures are of particular benefit to light soils, and produce excellent results on pasture and grass lands, potato and root crops in general, and leguminous crops. Heavy clay soils, as a rule, contain sufficient potash. Soils containing already a fair amount of chlorine in the form of chlorides, should not be manured with kainite or with potassium chloride, but potassium sulphate should be used, which, as a rule, is most suitable to our soils, and is used in quantities up to 1½ cwt. per acre. An application of 1 to 2 lb. of potassium sulphate with 1 to 2 lb. of dried blood, or 1 to 1½ lb. of ammonium sulphate, and with 6 to 8 lb. of bone dust, or 4 to 6 lb. of superphosphate per tree, have given excellent results for orange-trees and other citrus fruit.

Phosphatic manures, supplying chiefly phosphoric acid, are—**Bones**, in the form of **bone meal**, *bone dust*, and *crushed bones*, and contain from 3 to 4 per cent. of nitrogen, and from 18 to 23 per cent. of phosphoric acid. The action of bone manure is generally slow, and may extend over several years; the finer the bone is crushed the quicker the action, and for this reason the fineness of the meal should be stated. Raw bones are much richer in nitrogen than boiled or steamed bones. Bone manure is used chiefly as a top dressing for pasture lands, and are, as a rule, more beneficial to light soils than to heavy clayey soils. The great importance of a supply of phosphatic manure to pasture lands will be understood, when we consider that a cow which milks 10 quarts a day takes about 1 lb. of phosphate of lime, contained in the milk, from the soil every week, which has to be returned by manuring the pasture with about 2 lb. of bone meal per week, or about 1 cwt. every year.

Bone ash, the residue of burnt bones, contains no nitrogen, but up to 40 per cent. of phosphoric acid.

Superphosphate is prepared from either bones (*dissolved bones* or *bone superphosphate*), which then contains some nitrogen, or from bone ash (*bone ash superphosphate*), containing little or no nitrogen, and from mineral phosphates (*mineral superphosphates*), by treating the crushed raw material with a strong sulphuric acid of about 1·55 spec. gravity. A water soluble **monocalcium phosphate** is obtained according to the formula—

$$\underset{\substack{\text{Bone phosphate}\\\text{or}\\\text{tricalcium phosphate,}}}{Ca_3P_2O_8} + {}_2H_2SO_4 = \underset{\text{Gypsum}}{2CaSO_4} + \underset{\substack{\text{Superphosphate}\\\text{or}\\\text{monocalcium phosphate,}}}{CaH_4P_2O_8}$$

which on account of its solubility is a readily available plant food. The change into *reverted* or *retrograde phosphate* or **dicalcium phosphate,** $Ca_2H_2P_2O_8$, which is only soluble in citric acid, has already been explained. The value of a superphosphate depends chiefly on the amount of the monocalcium phosphate it contains; a high quality of superphosphate contains from 17 to 19 per cent. of water soluble phosphoric acid. Superphosphate also forms the basis of most manure mixtures; it is of particular value as a manure for turnips, corn, barley, and wheat, producing heavier crops of earlier maturity. Even very light dressings have been found beneficial, but, as a rule, quantities from 1 to 3 cwt. per acre are applied.

Thomas phosphate or **basic slag,** the by-product of steelworks, and, of late years, also artificially prepared owes its value to the citrate soluble phosphoric acid in the form of **tetracalcium phosphate,** $Ca_4P_2O_9$, or $CaO.Ca_3P_2O_8$, which it contains. The commercial meal contains from 17 to 18 per cent. of phosphoric acid, and its value depends also largely on the degree of fineness of the powder, which should be so fine that 80 to 90 per cent. pass through a sieve with 100 meshes to the linear inch, or 10,000 meshes per square inch. This manure is of particular value to sour lands, deficient in lime but rich in humus. It is an excellent manure for swedes, turnip, and also for fruit trees.

Miscellaneous manures.—**Lime, chalk, marl, shellsand,** which owe their manurial value to the amount of *carbonate of lime* they contain. **Burnt** or **quicklime** is obtained by strongly heating limestone, **slaked lime** by adding water to quicklime, and *air-slaked lime* by allowing quicklime to slake itself slowly, exposed to moist air, are all used as manures as top dressings, in quantities from 3 to 10 cwt. per acre, applied every two to three years. The very heavy dressings with lime, up to 30 tons, applied once every ten to fifteen years, which was customary years ago, cannot be recommended as suitable to our conditions, and more frequent but lighter applications are to be preferred. The great value of lime as a manure lies in its aid to nitrification, in neutralising the effects of acidity in soils, and again, the indirect action of

liberating potash and its action on clay already noticed. *Gas lime*, a waste product from gasworks, contains frequently poisonous compounds, and its general use as manure, without previous analysis, cannot be recommended.

Salt, sodium chloride, is occasionally used as manure, and has been found of value for cabbages, mangels, and asparagus.

Ferrous sulphate, green vitriol, which, when present in the soil, must be considered as a harmful ingredient, is, nevertheless, used as manure with beneficial results, particularly as a top dressing for meadows. It destroys moss on pasture lands, and is of advantage to mangels, beets, beans, cabbages, and cereal crops. In soils containing less than 5 per cent. of iron oxide it is used in quantities up to $\frac{1}{2}$-cwt. and $\frac{3}{4}$-cwt. per acre. According to Dr. Griffith, it increases the amounts of soluble carbohydrates and albuminoids in crops, making them more valuable as food stuffs; it also helps in the absorption of phosphoric acid and nitrogen, and destroys all parasitic fungoid diseases.

Relative Value of Manures.—The value of any manure depends on the quantities of nitrogen, potash, and phosphoric acid it may contain, and, in order that a farmer who purchases manure may depend on its quality, the sale of manures is regulated by the "**Fertilisers Act of 1905,**" which was introduced last session, and came into operation at the beginning of this year. Under this Act every dealer, agent, or manufacturer of fertilisers has to register the manures sold, and has to give to the buyer an invoice certificate, which must contain besides name and place of business, trade mark, quantity, and the composition in percentage of the fertilising ingredients. A certain *deficiency* in the composition is allowed for under the Act, which amounts to 5 per centum of the total amounts of potash or nitrogen certified to be present, and to 7 per cent. of the total phosphoric acid. For instance, differences as an ammonium sulphate containing only 19·4 per cent. of nitrogen instead of the certified 20·4 per cent., or potassium sulphate with only 49·8 per cent. instead of 52·4 per cent.; or, again, a superphosphate with only 17·5 per cent. instead of 18·8 per cent. of phosphoric acid, would be permissable under the Act. As the *fineness* of a manure is of great importance, more particularly with reference to bone meal and basic slag, the degree of fineness, by stating the amounts passing through sieves of standard sizes, has to be also given.

Hitherto great confusion existed in stating the composition of manures in various ways, giving, for instance, phosphoric acid as bone phosphate, tricalcic phosphate; nitrogen as ammonia and ammonium sulphate; potash as sulphate, chloride, &c.; and to avoid this, the Act provides for the statement in the simple amounts of percentage of **Nitrogen** (N.), **Potash** (K_2O), and **Phosphoric acid** (P_2O_5). A purchaser has the right of having any suspected sample of manure analysed, but certain instructions with regard to sampling, labelling of samples, &c., are laid down in the Act, and its regulations have to be adhered to, in order to safeguard the interest of buyer and seller. It would always be advisable that, in case of suspicion, samples are taken before the manure has come into actual possession of the buyer, as at the store or at the railway siding, and the sampling should be done in presence of the dealer or his agent, or, in their absence, in the presence of a State inspector or officer under the Act. The certified composition of all registered manures is published from time to time in this Journal, and we find a complete list in the April and June number.

In order to get at the comparative commercial value of a manure, more particularly in mixtures, it is customary to use **unit values**, which are the cost price of 1 per cent. per ton of the various fertilising constituents, or, actually, the cash value of 22·4 lb. of each ingredient.

For instance, in a sulphate of ammonia costing £15 per ton, containing 20 per cent. of nitrogen, the unit value of nitrogen would $\frac{1·5 \times 20}{15} = 15s.$

The following unit values are approximately fixed for the present year for Brisbane:—

		s.	d.	
NITROGEN	As nitrate	17	0	per unit.
	In ammonium salts	15	0	„
	In blood, fine bone, &c.	14	6	„
POTASH ...	As sulphate	6	0	„
	As chloride	5	6	„
PHOSPHORIC ACID	Water soluble	5	6	„
	Citrate soluble	4	0	„
	Insoluble in fine bone, &c.	3	0	„

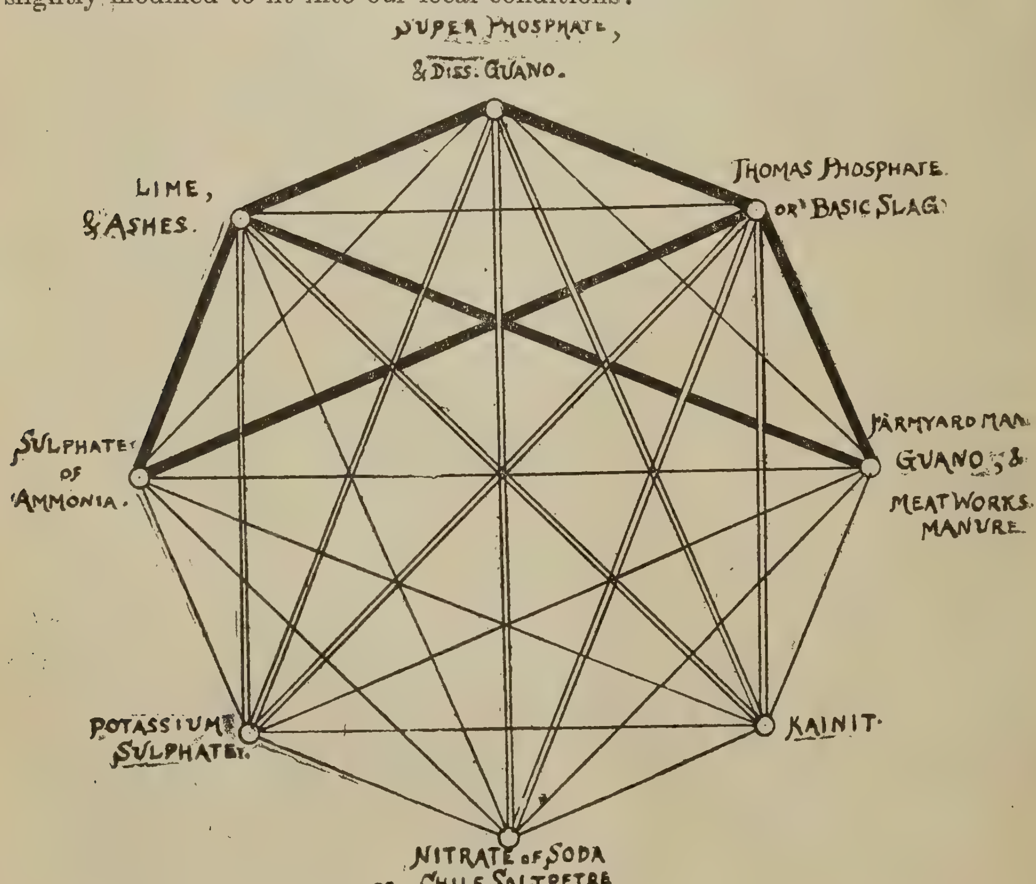
A manure which is offered at £8 per ton, and guaranteed to contain 6 per cent. of nitrogen as ammonium salt, 8 per cent. of potash as sulphate, and 10 per cent. of insoluble phosphoric acid as fine bone meal, would have the following actual value in accordance to our units:—

6 % of N	...	6 × 15/- = 90/-
8 % of K_2O	...	8 × 6/- = 48/-
10 % of P_2O5	...	10 × 3/- = 30/-
	Total ...	168/- = £8/8/-

It must be understood, however, that in many instances this value, derived from the chemical composition of a manure mixture, does not represent the actual value of the manure, which depends from many other causes, local conditions, and requirements. Some standard is necessary, and in most cases the calculated value agrees fairly well with the price asked for.

Mixing and Preservation of Manures.—All manures should be in a dry, friable condition, and must be free from hard lumps, and for this reason should be kept in good dry bags and in covered sheds.

When mixing various fertilisers together, such mixture must be avoided which would lead to decomposition, as, for instance, ammon. sulphate mixed with lime or with Thomas phosphate, or superphosphate with nitrate of soda; or which may cause caking, like mixing kainite with Thomas phosphate, or with superphosphate. A very simple guide for the mixing of manures is given in the accompanying diagram, devised by Dr. Geekens, which, however, I slightly modified to fit into our local conditions:—



Manures joined by a *heavy black line* should *never be mixed* together.

Those connected by a *double* line must only be *mixed immediately before use.*

Those joined by a *thin single line* may be safely *mixed* together *at any time.*

APPENDIX TO TWELFTH LESSON.

The student or teacher should obtain from the dealers, registered under the Act, smal samples of their various manures for experimenting.

Questions to Twelfth Lesson.

1. Why should cultivated lands be manured from time to time?
2. What is the principle of Liebig's "law of minimum"?
3. Which are the principal factors of growth of a plant?
4. What is the composition of stable manure?
5. Name the principal natural manures?
6. Describe the difference in the value of nitrate of soda and ammon. sulphate.
7. Which are other nitrogenous manures?
8. What potash manures are most suitable to our conditions?
9. Enumerate and describe the most important phosphatic manures?
10. What are the objects of a Fertilisers Act?
11. What are unit values; and how are they used for the calculation of the value of a mixed manure?
12. Give a few instances what manures should never be mixed, and a few which may be mixed at any time.

MARKET FOR PEANUTS.

The Department of Agriculture has received a letter from Mr. Lennard, of Torrens Chambers, Adelaide, stating that there is a good local market for Japanese hand-picked peanuts at £16 15s. per ton, in addition to which there is the freight, insurance, and duty of 2d. per lb., which raises the price to £35 8s. 4d. per ton. The market ought to be a good one for Queensland growers.

CALF-FEEDING.

The British Board of Agriculture has issued a very interesting bulletin on calf-rearing. It is recommended that the dietary for a calf should be as follows:—

First week.—Its own mother's warm milk three times a day, commencing with about a quart and increasing to two quarts by the third day.

Second week.—Two quarts of warm new milk (not necessarily its own mother's) three times a day.

Third week.—Two pints of new and three pints of skim (or separated) milk three times a day, with half a pint of linseed porridge or half a table-spoonful of cod-liver oil.

Fifth week.—Three quarts of warm skim milk three times a day, with one of linseed porridge or one tablespoonful of cod-liver oil and a little sweet meadow hay increased week by week.

Ninth week.—Midday milk and cream substitute omitted. Five quarts of separated milk are given morning and evening, a handful of broken linseed cake (6 oz.) at midday, and hay, increasing week by week.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE TOTAL RAINFALL FOR EACH MONTH OF THE YEAR IN THE AGRICULTURAL DISTRICTS OF QUEENSLAND.

STATIONS.	1905.								1906.				
	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.	May.
North.													
Bowen	0·74	0·53	0·39	0·06	4·03	0·05	3·91	0·04	12·84	8·73	6·29	0·78	6·34
Cairns	3·89	1·94	0·43	2·27	Nil	0·46	1·72	0·53	7·00	16·87	16·05	5·20	4·04
Geraldton	13·35	9·39	2·41	3·88	Nil	0·22	5·44	1·14	15·61	37·67	19·67	11·51	7·93
Herberton	2·67	1·17	0·05	0·89	Nil	0·21	1·69	0·51	15·20	3·73	4·67	1·25	1·38
Hughenden	Nil	0·41	0·47	Nil	Nil	0·13	0·07	0·14	6·11	3·93	8·47	0·12	Nil
Kamerunga	5·63	2·59	1·11	2·16	Nil	0·63	1·05	0·33	7·25	13·76	14·93	4·94	4·13
Longreach	Nil	Nil	0·22	Nil	Nil	0·06	0·77	0·17	3·99	8·61	12·25	Nil	0·22
Lucinda	3·15	1·92	4·14	0·89	0·15	0·68	2·03	0·95	10·13	49·97	25·88	10·12	3·77
Mackay	2·17	1·82	0·95	0·66	0·97	0·08	2·45	0·70	13·58	9·88	16·57	2·87	11·87
Rockhampton	0·95	0·54	0·26	0·51	0·70	0·91	1·05	4·77	4·24	15·31	8·26	Nil	5·27
Townsville	0·52	0·35	0·68	0·06	...	0·52	0·19	Nil	10·05	17·31	4·28	0·38	1·80
South.													
Barcaldine	Nil	Nil	0·30	0·04	Nil	0·15	1·49	1·30	4·00	7·07	13·84	Nil	1·70
Beenleigh	2·21	0·40	0·27	1·12	1·15	2·82	1·76	3·77	4·96	15·11	9·34	0·04	3·57
Biggenden	1·46	0·60	0·28	0·10	0·79	2·56	1·14	11·66	2·27	8·24	4·61	0·45	5·77
Blackall	0·21	Nil	0·68	0·04	Nil	0·29	1·45	0·83	5·13	11·14	11·99	Nil	1·75
Brisbane	1·10	0·39	0·28	0·65	1·32	2·22	3·63	8·21	4·16	12·71	4·85	0·45	3·23
Bundaberg	4·26	1·10	0·71	0·17	0·95	2·37	0·95	6·74	6·92	9·92	1·90	1·17	8·44
Caboolture	1·65	0·26	0·05	0·36	0·98	2·73	2·88	6·72	8·11	12·73	6·46	0·49	4·53
Charleville	0·63	0·01	0·15	0·14	0·09	0·99	0·68	0·12	1·29	10·66	3·15	0·07	...
Dalby	2·19	0·25	1·15	0·76	0·14	2·09	1·60	5·67	4·15	4·43	5·15	1·81	0·66
Emerald	0·72	0·06	0·50	0·30	0·29	0·64	4·41	0·80	6·12	7·81	5·22	0·08	2·12
Esk	1·68	0·33	0·52	0·57	0·65	3·21	3·65	5·98	5·49	6·79	9·04	1·74	3·25
Gatton College ...	2·56	0·26	0·98	0·27	0·54	2·59	3·59	4·73	3·75	5·33	9·43	1·40	1·90
Gayndah	1·07	0·42	0·54	0·25	0·30	2·38	1·93	5·58	2·81	9·65	5·86	0·51	5·10
Gindie	0·41	0·11	0·37	0·09	Nil	1·11	3·79	Nil	1·92	9·15	5·92	Nil	2·32
Goondiwindi	1·23	0·55	0·52	0·58	Nil	3·57	1·51	2·72	1·08	2·60	2·19	0·37	2·80
Gympie	4·49	0·79	0·78	0·70	1·85	1·48	1·44	5·03	6·07	7·38	5·58	0·45	6·88
Ipswich	1·98	0·50	0·44	0·78	0·70	2·91	3·32	3·64	5·30	7·22	3·87	0·12	1·67
Laidley	2·59	0·56	0·56	0·61	0·30	2·36	3·59	3·73	3·29	5·63	6·73	0·35	2·83
Maryborough	3·56	1·21	0·07	0·26	1·04	2·48	0·70	4·03	4·46	8·34	6·77	1·08	4·85
Nambour	4·79	1·36	0·05	0·83	1·62	4·70	0·85	5·37	7·01	16·50	9·35	1·13	6·20
Nerang	3·63	0·61	0·27	1·55	1·04	4·59	2·21	5·14	5·01	13·68	10·04	0 87	10·32
Roma	1·72	0·21	0·35	0·31	0·15	1·02	2·15	2·62	2·18	12·95	3·94	Nil	1·09
Stanthorpe	1·63	1·01	0·63	1·77	0·28	3·48	1·94	4·43	6·06	2·76	3·18	2·00	0·77
Tambo	0·12	0·06	0·36	0·46	Nil	0·85	1·57	0·39	5·09	9·05	10·63	Nil	0·66
Taroom	2·22	0·33	0·67	0·31	Nil	0·76	1·11	2·52	1·86	13·73	6·02	0·23	1·04
Tewantin	10·01	2·06	0·22	0·55	1·29	6·57	1·28	6·64	12·07	18·59	7·57	2·27	4·61
Texas	3·07	0·80	0·53	1·09	0·16	3·54	0·94	4·54	3·41	2·11	1·94	1·89	1·57
Toowoomba	3·69	0·65	1·01	0·66	0·61	2·59	2·09	3·20	6·17	6·58	8·87	2·07	2·65
Warwick	2·18	0·77	0·26	1·01	0·41	4·00	2·16	3·98	2·09	2·21	6·27	0·37	0·77
Westbrook	2·54	0·46	0·71	0·61	1·23	2·60	3·62	2·39	5·00	4·01	5·12	0·93	0·50

GEORGE G. BOND,
For the Hydraulic Engineer.

PRICES IN BRITISH MARKETS OF ARTICLES WHICH CAN BE PRODUCED IN QUEENSLAND.

BUTTER.—Australian: Unsalted, 100s. to 108s.; exceptionally, 110s.; Dalgety and Co. quote 76s. to 98s. for other sorts. New Zealand, 76s. to 101s.; Danish, 104s. to 106s.; Siberian, 84s. to 96s.; Argentine, 92s. to 98s.

CHEESE.—Canadian, 40s. to 66s.; New Zealand, 59s. to 65s.; Queensland (Glenmore), 60s. per cwt.

SUGAR (duties, raw, 2s. to 4s. 9d. per cwt.; refined, 4s. 2d. and ¼ per cent.).—Refined, £17 to £19 10s.; raw, £14 to £18 10s. per ton; German beet, 8s. 10d. per cwt.

MOLASSES (duty, paid or allowed, 1s. to 2s. per cwt.; for agricultural purposes only, duty free).—5s. to 9s. per cwt.

RICE.—Real Carolina, £20 to £28; Rangoon, £9 to £12; Japan, £13 to £17 10s.; Java, £16 to £20; Patna, £15 to £17 per ton.

COFFEE (in bond, duty 1½d. per lb.).—Ceylon plantation, 105s. to 124s.; peaberry, 78s. to 115s.; Santos, 42s. to 48s.; Jamaica, 75s. to 130s. per cwt.

CHICORY ROOT, DRIED (duty paid, duty 13s. 3d.)—24s. to 27s. per cwt.

ARROWROOT.—St. Vincent, 1¾d.; Natal, 5d.; Bermuda, 1s. 5d. per lb.

Maize, 23s. to 25s. per 480 lb. = 2s. 10½d. to 3s. 1½d. per bushel.

WHEAT.—Duluth, 31s. to 34s. per 496 lb.; English, 31s. to 33s. per 504 lb.; Australian, 31s. to 31s. 3d. per 496 lb.

MALTING BARLEY.—33s. to 37s. per 448 lb.; grinding, 24s. to 26s. per 416 lb.

OATS.—New Zealand, 24s. 3d. to 26s. per 384 lb.

SPLIT PEAS.—43s. to 50s. per 504 lb.

GINGER.—Jamaica, 58s. to 68s.; Cochin, 26s. to 27s.; Japan, 26s. to 27s. per cwt.

VANILLA.—3s. 9d. to 7s. 6d., 7 to 7½ in.

PEPPER.—Capsicums, bright red, 50s. to 57s.; mixed yellow, 50s.; chillies, bright red, 28s. to 30s.; mixed yellow, 30s. 6d. per cwt.; black, 5d. to 5½d.; white, 7⅝d. to 10¼d. per lb.

RUBBER.—3s. 10d. to 5s. 4d.; Ceylon "biscuits," 6s. 6d. per lb.

GREEN FRUIT.—Apples: Australian, 10s. 6d. to 14s. to 18s.; Tasmanian, 11s. 6d. to 15s.; Tasmanian French crabs, 10s. to 10s. 6d.; Australian pears, 10s. to 22s. per case; bananas, 7s. to 14s. per bunch; pineapples, 3s. to 6s. each. Oranges, Valencia, per 420, common, 12s. to 13s. 6d.; medium, 15s. to 17s.; fine selected, 17s. to 20s.; choicest, 26s. to 35s. Lemons, Messina, per 360, ordinary to fine, 14s. to 15s.; finest selected, 16s. to 21s. per case. Grapes, Almeria, from 16s. to 17s. 6d. for fine and very fine; 22s. to 23s. for choicest per barrel.

DATES.—Tafilat, 70s. to 72s.; Egyptian, 18s. to 20s. per cwt.; Persian, 12s. to 16s. 6d. per case.

COTTON.—Uplands, Australian (Queensland), 6¼d. to 6½d.; Sea Island, 15½d. to 20d. per lb.

COTTON SEED.—£7 1s. to £7 2s. 6d. per ton.

COTTON-SEED OIL.—Crude, £20 10s.; refined, £22 5s. per ton.

COTTON-SEED OIL CAKE.—£4 15s. to £5 per ton.

COTTON WASTE.—In 5 cwt. bag bales, 24s. to 34s.; discoloured, 18s. to 25s. per cwt.

LINSEED.—45s. 10d. per qr.

LINSEED OIL.—£21 10s. to £22 per ton.

LINSEED OIL CAKE.—£7 13s. 9d. to £8 per ton.

OLIVE OIL.—£35 10s. to £39 per tun (252 gallons).

COPRA.—£18 10s. to £19 15s. to £20 per ton.

COCOANUT OIL.—£29 per ton.

BEESWAX.—Australian, £7 to £7 10s. per cwt.; Peruvian, £7 10s.

LUCERNE SEED.—58s. to 64s. per cwt.

CANARY SEED.—47s. 6d. to 48s. per quarter of 480 lb. = 5s. 10½d. to 6s. per bushel.

HONEY.—16s. to 25s. per cwt.

MANILA HEMP.—£40 to £43 to £48 10s. per ton.

SISAL HEMP.—Indian, £34 to £36 10s. per ton; Mexican withdrawn from sale in view of higher prices. Sales of Queensland sisal were made in Melbourne during February and May, at £35 and £37 10s. per ton f.o.b. Brisbane.

NEW ZEALAND HEMP.—£34 10s. per ton.

FOURCROYA (Mauritius Hemp).—£34 per ton.

SANSIVIERIA (Murva or Bowstring) HEMP.—Bright, £40; dark, £35 per ton.

RAMIE.—£36 to £42 per ton. (Quotations for hemp are for best samples).

ESPARTO GRASS.—£3 5s. to £5 5s. per ton.

JUTE.—There appears to be somewhat of a panic in the jute market. Messrs. Gillanders, Arbuthnot, and Co., writing to the "Courier" from Calcutta on 19th May, says:—

In our last report we mentioned that jute had risen to a famine level; since then prices have again advanced, and these are being paid for jute which is saturated with water and rotten. The new crop has got the rain which it wanted, and in most directions is doing really well; the only important exception is the Serajganj district, which has suffered so much from drought that our private advices indicate a 25 per cent. shortage. In view of the present scarcity of jute, and the fact that foreign mills are disposed to buy the new crop at something like current prices, both millers and consumers are showing signs of panic, and while a week ago we could have bought 15,000 bales of cornsacks at the equivalent of 7s. c.i.f. Sydney or Melbourne, when speculators placed buying orders on the market two days ago at this rate, they were only able to secure 1,700 bales, and we doubt whether to-day we could buy any quantity at less than 7s. 1d. Mills are suffering from labour troubles, and we expect that this, coupled with insufficient stocks of raw material, will we are likely to see prices rise to at least 7s. 6d. [Prices went to 7s. 9d. on 19th June.—Ed. "Q.A.J."]

DIVI DIVI.—£8 to £11 per ton.

TAPIOCA (duty, 5d. per cwt.).—2¼d. to 2½d. per lb.; pearl, 21s. to 23s. per cwt.

EGGS.—French, 9s. to 9s. 6d.; Danish, 6s. 9d. to 8s. per 120.

BACON.—Irish, 62s. to 71s.; American, 52s. to 56s.; Canadian, 59s. to 64s. per cwt.

HAMS.—Irish, 84s. to 108s.; American, 54s. to 60s. per cwt.

PORK (frozen).—5½d. per lb.

TALLOW.—Mutton, fine, 31s. 9d.; medium, 28s. 9d.; beef, fine, 30s.; medium, 28s. 6d. per cwt.

POULTRY (Smithfield).—Surrey fowls, 3s. 9d. to 5s.; Lincolnshire fowls, 2s. 3d. to 3s. 6d.; Essex fowls, 2s. 9d. to 3s. 9d.; Irish fowls, 2s. to 3s.; feathered pigeons, 9d.; geese, 5s. 6d. to 7s.; ducks, 3s. to 4s.; turkey cocks, hens, English hares, wild rabbits, no quotations; Australian rabbits, 13s. per crate; 5s. 6d. to 7s. 6d. per dozen.

FROZEN MEAT.—The following are the Frozen Meat Trade Association's Smithfield market quotations for the undermentioned classes of frozen meat, based on actual sales of not less than 100 carcasses of mutton or lamb, or twenty-five quarters of beef, of fair average quality. These quotations are not for selected lines, but for parcels fairly representative of the bulk of the shipments now on the market:—

New Zealand Sheep.
(Crossbred Wethers and Merino Ewes.)

	June 16.	June 23.
Canterbury, light (48 lb. to 56 lb.)	3¾d.	3¾d.
Canterbury, medium (56 lb. to 64 lb.)	3¾d.	3¾d.
Canterbury, heavy (64 lb. to 72 lb.)	3⅜d.	3⅜d.
Southland (56 lb. to 64 lb.) ...	None offering.	
North Island (56 lb. to 65 lb.), ordinary	3$\frac{5}{16}$d.	3$\frac{5}{16}$d.
North Island, best brands (56 lb. to 65 lb.)	3⅜d.	3⅜d.

Australian Sheep.
(Crossbred and Merino Wethers.)

Heavy (over 50 lb.)	$3\frac{1}{8}$d.	$3\frac{1}{8}$d.
Light (under 50 lb.)	$3\frac{1}{4}$d.	$3\frac{1}{4}$d.

River Plate Sheep.
(Crossbred and Merino Wethers.)

Heavy (over 50 lb.)	$3\frac{3}{16}$d.	$3\frac{1}{8}$d.
Light (under 50 lb.)	$3\frac{7}{16}$d.	$3\frac{3}{8}$d.

New Zealand Lambs.

Canterbury, light (28 lb. to 36 lb.)	$4\frac{13}{16}$d.	$4\frac{13}{16}$d.
Canterbury, medium (36 lb. to 42 lb.)	$4\frac{13}{16}$d.	$4\frac{13}{16}$d.
Canterbury, heavy (42 lb. to 50 lb.)	$4\frac{11}{16}$d.	$4\frac{11}{16}$d.
Southland (28 lb. to 42 lb.) ...	$4\frac{5}{8}$d.	$4\frac{5}{8}$d.
North Island (28 lb. to 42 lb.) ...	$4\frac{9}{16}$d.	$4\frac{9}{16}$d.

Australian Lambs.

30 lb. to 40 lb., best brands (28 lb. to 42 lb.)	$4\frac{1}{16}$d.	$4\frac{1}{16}$d.
30 lb. to 40 lb., fair quality (28 lb. to 42 lb.)	$3\frac{7}{8}$d.	$3\frac{7}{8}$d.
30 lb. to 40 lb., inferior quality (28 lb. to 42 lb.)	None offering.	

River Plate Lambs.

28 lb. to 42 lb.	$3\frac{3}{4}$d.	$3\frac{3}{4}$d.

New Zealand Frozen Beef.

Ox, fores (160 lb. to 220 lb.) ...	$2\frac{3}{8}$d.	$2\frac{3}{8}$d.
Ox, hinds (160 lb. to 220 lb.) ...	$3\frac{3}{8}$d.	$3\frac{3}{8}$d.

Australian Frozen Beef.

Ox, fores (160 lb. to 200 lb.) ...	None offering.	
Ox, hinds (160 lb. to 200 lb.) ...	None offering.	

River Plate Frozen Beef.

Ox, fores (160 lb. to 220 lb.) ...	$2\frac{1}{4}$d.	$2\frac{1}{4}$d.
Ox, hinds (160 lb. to 220 lb.) ...	$3\frac{1}{8}$d.	$3\frac{1}{8}$d.

QUEENSLAND TIMBERS.—So much interest has been evinced in the Southern markets in our Queensland hard and soft woods, and the scrub timbers suitable for ornamental work and high-class furniture, that we strongly advise holders of land containing such timbers to refrain as much as possible from des troying them. Scrub timbers, such as yellow-wood, ivory-wood, red cedar, beech, hoop, Kauri and Bunya pine, crow's ash, silky oak, and many of the acacias will all find a ready sale in the near future at remunerative prices. The same applies to the forest timbers—tallow-wood, swamp mahogany (for piles, unbarked), ironbark, grey, spotted, red, and other gums (excepting white gum), red stringy bark, &c. The great demand both locally and in South Africa for Queensland railway sleepers, bridge girders, and piles must result in higher prices, and those who are wise enough to preserve the timber on land not required for cultivation will find that timber pays better than corn.

General Notes.

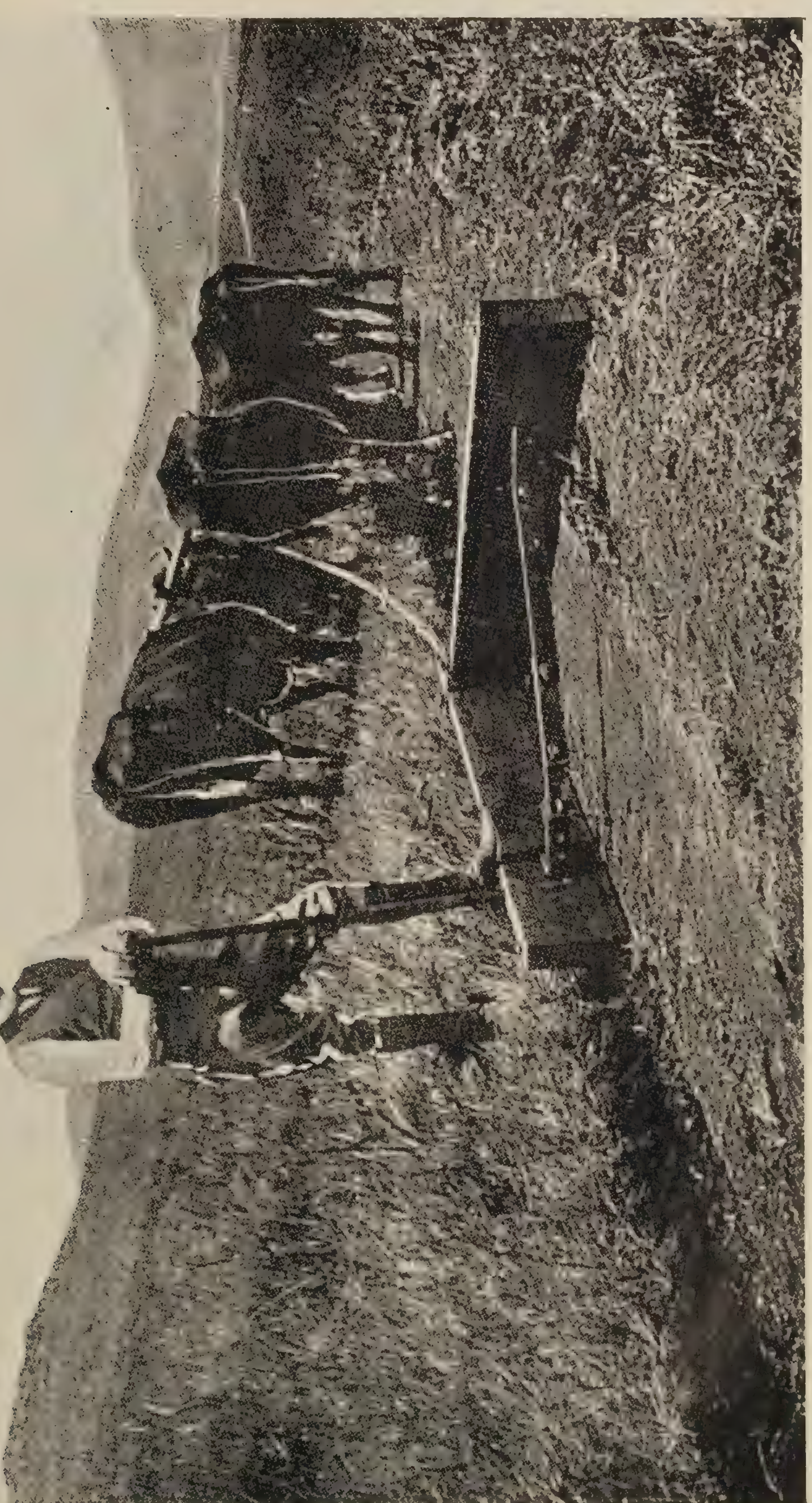
A ROAD-MAKER.

The rapid selection of land which has of late been taking place in various parts of Queensland has necessitated the making of many miles of road to afford easy access to farms lying at some distance from a main road or railway line. Road-making by manual labour is a rather expensive business, but the work must be done, otherwise the land must remain idle, or the farmers are so handicapped by the want of roads that the profits from the products of the soil are often nil. We have been favoured with several excellent articles on "Good Roads" by the Hon. A. J. Thynne, M.L.C., which all go to show how easily well-made roads can be kept in good order, and also how cheaply they can be made provided the proper appliances are used. We now find in the "Natal Agricultural Journal" a very excellent device for road-making illustrated. It is the invention (or, rather, we should call it an adaptation) of Mr. M. Kelly, District Forest Officer, Maritzburg.

The invention, or possibly unconscious adaptation of a snow plough, or some kindred implement, will best be understood from examination of the accompanying photograph. The simplicity is at once obvious. Two pieces of 3-inch by 12-inch timber, one 11 feet and the other 10 feet long, are joined together at one end by a bolt hinge, and are kept apart at the other end by a spreader. At the nose of the implement the longer piece of wood is bevelled off sharp to the near side, and the shorter piece is similarly bevelled so that it may lie fairly close at the point of junction. That point is where the bevelling of the long piece begins, about 4 inches from its sharpened coulter-like edge. This fore part is protected by a shield of iron plate, and the draught is from the point of the main beam. The handle upon which Mr. Kelly is resting his hands is a piece of piping. In going through gateways, and under other occasional circumstances, this handle is of service; when the implement, however, is at its work the haulage keeps it in its proper place and no guiding is necessary. The "road-maker" has been designed for the making of cheap roadways on the slopes of that portion of the Little Swartkop Mountain which comes within the Government Experiment Farm, slopes destined to be forest clad before long. The road shown in the photograph is intended to accommodate two horsemen. The length completed by way of experiment is 620 yards, and the total work in connection, including ploughing, amounted to seven hours for a ploughman and two natives. The job, done with pickaxe, spade, and shovel, would have taken ten or twelve boys a fortnight to accomplish, and thus the invention may be considered already paid for out of its first day's experimental work. Of roadways such as that in the illustration several miles will be required.

For scraping out roads to take wheeled traffic this implement, on a larger scale, of course, would be equally serviceable. The working is perfectly simple. Firstly, peg out the road, then plough two or three furrows; then push the sods aside with the road-maker, and so on until the desired breadth is attained. The construction of the "road-maker" is so simple that anyone having a small share of mechanical skill should be able to make one for himself. The only materials required are the wood, the bolts, and some old wagon wheel tire iron for the spreader and for the shoeing of the beams. The shoeing, however, would only be necessary if the amount of work to be done were considerable. The "road-maker" depicted was constructed by Messrs. Merryweather and Sons, Maritzburg.

Plate VI.



A Road Maker.

HIGHEST JUTE PRICES SINCE 1872.

Dundee.—The advance in the price of jute to 53 rupees, business done, cabled from Calcutta, caused a little excitement in our market, and raised values here all round. First marks advanced to £21 10s., and Daisee to £19 5s., April, whilst on spot £26 is lowest for Block D quality, and £23 10s. for Green D. Yarns have advanced in sympathy with jute, and there are fewer selling. For 8 lb. cops 2s. 2d. is now being paid, and 2s. 3d. for medium warps for delivery, say, May. Sacking yarns are dearer, and £20 is now lowest for 1 lea chains. Hessians in all widths, 50 inches and over, sell steadily at 2 7-12d. to 2 8-12d. for 10-oz. and over, and at 2 4-12d. to 2 5-12d. for 8-oz., but narrow goods can still be had at 2 11-24d. to 2½d. for 10½-oz., and 2¼d. for 8-oz. For 10 porter floorcloth qualities 2¾d. is lowest. To-day's prices for jute, yarns, and cloth are higher than we have seen since 1872.—"Commercial Intelligence."

ADVERTISING COLONIAL INDUSTRIES.

Whilst other countries are straining every nerve to take advantage of the high prices now ruling for various kinds of fibres, Queensland farmers—not including dairy farmers, of course—are most unaccountably apathetic in the matter. Last month they were jubilant at the rise in price of pumpkins to £2 per ton! Yet the reduction in the area under Sea Island cotton in America, the consequent rise to 17d. and 20d. per lb., the alarming decrease in the production of Manila hemp in the Philippines, fail to stir them to energetic action. Nothing new appeals to them; pumpkins at £2 are more appreciated than £14 to £17 per acre for cotton, £37 10s. for sisal hemp, &c. The British Cotton-growing Association, in consequence of this apathy, saw no prospect of advancing the cotton industry in Queensland, and, therefore, devoted its energies to more energetic countries, especially to the West Indies and Africa, where the cotton-growing industry is now booming. Queensland was a cotton-growing country when nothing but sugar and rum formed the staple products of the West Indies. What is Queensland doing now in the way of cotton-growing? From Mr. D. Jones' paper on the industry in this State, it appears that there are over 1,000 persons receiving Government relief who are all able-bodied enough to earn from 2s. to 4s. per day at cotton-picking, yet the rural taxpayer prefers to be taxed to support hundreds of idle hands to entering upon an industry which would keep whole families in comfort. Look at the West Indies. The "Barbados Agricultural News" writes:—

The West Indies are making considerable strides in cotton cultivation, and the island planters are now said to be producing absolutely the finest cotton ever grown. The present crop will represent a value of £100,000 sterling. Some of it was sold on the Liverpool market last week for 1s. 8d. per lb., or 6d. per lb. more than the American Sea Island variety. Sir Alfred Jones has just received a letter from Sir Daniel Morris, K.C.M.G., D.Ss., Imperial Commissioner of Agriculture for the West Indies, stating that the area under cotton will be largely increased next year, and instancing one planter with 100 acres who has decided to plant 400 acres immediately. Referring specially to the Northern Islands of the group, the Imperial Commissioner says that, despite the recent drought, there will be a good lot of cotton shipped. He also reports that some of the new Barbados cotton has obtained 16d. to 18d. per lb., while St. Vincent cotton has sold for 18d. to 20d. per lb.

The British Cotton-growing Association has adopted a novel method of stimulating public interest in the movement. From this West Indian cotton, handkerchiefs are being manufactured, which for fineness and softness of texture compare well with silk goods. Sir Alfred Jones has given an order for

2,000 of these handkerchiefs, which he proposes to distribute as gifts among the cotton operatives of Lancashire, believing that, in this fashion, a greater personal interest will be aroused in the scheme for producing British-grown cotton for British mills.

The British Board of Trade journal publishes the following from Natal, South Africa:—

RUBBER AND FIBRE CULTIVATION.

The correspondent at Durban of the Board of Trade (Mr. A. D. C. Agnew) has forwarded a cutting from the "Natal Mercury" containing a report of a paper on "Profitable Agricultural Industries," by Mr. J. Medley Wood, Director of the Botanic Gardens at Durban.

Mr. Woods states that, in the opinion of all authorities on the matter, the collection of rubber from the Landolphia plant, which has been found growing in abundance in Zululand, will pay, given cheap labour and efficient supervision. He is of opinion that the trees which yield the rubber known as Panama and Para are quite unsuitable for the climate of Natal.

Mr. Wood believes that there will be a considerable export of fibre from the colony before many years have passed, the industry being now after many years of experiment, fairly started at Port Shepstone (in the southern part of Natal) and in Zululand.

He advises growers to keep, for the present, to the plants that are well known to be profitable, that is to say, *Agave rigida, var. sisalana*, the "sisal" hemp of commerce, and those species or varieties of fourcroya which are without spines on the edge of the leaves, and yield the fibre commonly called "Mauritius hemp," the best variety of which is known in Mauritius as "aloe creole."

In connection with the last paragraph of the above extract, we would advise all intending sisal planters to obtain, even at any cost, the true sisal plant—*Agave rigida, var. sisalana*. There is a variety of *Agave rigida*—*not* sisalana—which produces excellent fibre, but whose leaves are spiny, rendering harvesting more laborious and very slow.

Of the Fourcroyas, the broad-leaved spineless plant which is grown in Mauritius is the best. It is, however, wrongly called an aloe. It is not an aloe. The plant grows luxuriantly in Queensland. During May and June some tons of Fourcroya leaves from the Botanic Gardens, Brisbane, were cleaned at St. Helena. These leaves reached a length of from 7 to 9 feet, and even more. The fibre is finer than sisal fibre, but much weaker. It also has not the lustre of true sisal, and, owing to its weakness, there is considerable waste in scutching and brushing. The price of the fibre is also less than for true sisal by about from £3 to £5 per ton. Still, the great length of the fibre—nearly double that of sisal—compensates for the reduced price. The plant also comes to maturity much quicker than the sisal plant, for which reason a small area might be planted to cover expenses whilst the latter is maturing.

We have on several occasions advised farmers to try a small plot of ginger. If that advice had been followed, the result would now be as described in the following extract from Gillespie and Co.'s New York market report for 16th March:—

Ginger continues to be the principal factor in the spice market. The continued upward movement of the European market, and the situation in Jamaica as reported by cable, make it almost impossible to attempt to predict what price Jamaica root will reach, or even to name quotations. London has advanced 2s. per cwt. within the past fortnight, and buyers here have advanced their ideas 1 c. (½d.) per lb., but were unable to obtain any ginger even at the advance. With the situation as it is to-day, it is possible to obtain almost

Plate IV.

Plate V.

Flower Pole of a Fourcroya.

any price within reason for the small parcels that are coming to hand. On to-day's market, we quote from 8 c. to 8⅝ c. (4d. to 4¼d.) per lb. for dark scraggy root, and from 10 c. to 11½ c. (5d. to 5¾d.) per lb. for the small white to bright bold ginger.

The average yield of ginger per acre in good soil and under favourable weather conditions is from 1,000 to 1,500 lb. In exceptional cases, 2,000 lb. have been gathered. There is always a good market for the spice. The United States alone import over 3,000,000 lb. annually. The plants thrive in Queensland, but every jam-maker imports the article. In Jamaica, the peasants plant from a few square yards up to 6 acres annually.

Last month we wrote on the subject of paper-making, of course, without the slightest hope of any action being taken either by farmers to produce the raw material or by capitalists to form a company for erecting paper-mills. Yet, little Trinidad takes the matter up, and a company for the manufacture of paper from bamboo fibre has been started on the island. The machinery for this enterprise arrived on 2nd March. The factory is to be at Gasparre Island, where a suitable property has been rented.

The Bermuda Government has voted the sum of £250 towards defraying expenses of experiments in tobacco-growing at that place; and it is understood that a Jamaica manufacturer has decided to move his establishment to that island. On her last trip to Bermuda, the s.s. "Beta" took four cigar-makers from Jamaica.

We could quote many instances of enterprise on the part of the West Indians, but the few we have given will show how alive those colonists are to their own interests in the way of agricultural products, new and old.

NEW VARIETY OF COTTON.

The British Chargé d'Affaires at Guatemala has forwarded to the Board of Trade a sample of cotton grown in the Retalhulen district of Western Guatemala, known as pachon, and said to be possessed of special weevil-resisting characteristics. It is a short-season cotton, says the board's journal, productive and ripening very early, with a fibre of good length and texture. The rapid ripening tends to leave the weevil without opportunity to breed during a large portion of the year.—"Commercial Intelligence."

DATE PALM CULTIVATION.

The Agricultural Department in Egypt have just forwarded to the Ceylon Agricultural Society, with their compliments, a consignment of suckers of some of the best varieties of the date palms to be found in Egypt. The Royal Botanic Gardens at Peradeniya has received a couple of dozen suckers of six varieties. These are to be despatched to suitable localities in the island.—"Commercial Intelligence."

FORESTRY IN CHINA.

The policy of the German Government in promoting forestry in Kiao-chau is already bearing satisfactory fruit. Every year, according to the "Times" quotation of a German newspaper, the area of afforestation grows larger, and the Chinese, stimulated by German example, are said to be planting trees on their own account, and to be awake to their value as wind-breaks.

AGRICULTURAL AND HORTICULTURAL SHOWS.

The Editor will be glad if the secretaries of Agricultural and other Societies will, as early as possible after the fixture of their respective shows, notify him of the date, and also of any change in date which may have been decided on.

THE SCOTIA FIRE-BEATER.

Those who have had experience in subduing fierce bush fires know what exhausting work it is to stop a fire when it is assisted by a high wind, and how difficult it is to beat it down in high grass with the usual implements—green bushes or gunny and flour bags. We here illustrate a very capital contrivance for the purpose invented by Mr. John Wilson, Brisbane. It is very light and handy, and possesses the important qualities of durability and cheapness. Following is a short description of this useful invention.

Handle, 3 feet 6 inches long, 1⅛ inches round, at the end of which is a knob, conical in shape, made of red gum or jarrah. A sheepskin basil, having a hole in the centre, is slipped over the handle, and is secured from coming off by the knob just described. A chafering piece is provided inside and outside of the basil where it comes in contact with the knob, to prevent friction, and the three pieces are firmly rivetted together. Over the top of the handle a metal socket is passed, which keeps the whole in position, and is secured by a screw. One of the best points of the invention is the admirably adjusted weight of the socket, which enables a firm downward effective blow to be given when dealing with cane or heavy grass. There is nothing like leather!

The Markets.

PRICES FOR FRUIT—ROMA-STREET MARKETS.

Article.	JUNE. Prices.
Apples, Eating, per packer, Hobart	...
Apples, Eating, per packer, Hobart, best sorts	12s. to 16s.
Apples, American, per packer	...
Apples, Cooking, per packer	9s. to 12s.
Apples, Local, per packer	...
Apricots, quarter-case	...
Bananas, per dozen (scarce, demand for local grown)	2¾d. to 3d. and 4d.
Bananas, per dozen	...
Cherries, quarter-case	...
Comquats, case	...
Lemons, per case, Local	5s.
Lemons, per case, Imported	6s. 6d.
Mangoes, half-case	...
Oranges, per packer, Imported	...
Oranges, Local, per packer	2s. 6d. to 3s.
Passion Fruit, quarter-case (scarce)	4s. 6d.
Papaw Apples, per case	...
Peaches, quarter-case	...
Peanuts, per lb.	2½d.
Pears, Imported, per quarter-case	6s.
Pineapples (rough leaf), best sorts, per dozen	2s. 6d.
Pineapples (smooth leaf), best sorts, per dozen	4s. to 4s. 6d.
Plums, Imported, quarter-case	...
Plums, Local, quarter-case	...
Persimmons, quarter-case	4s. 6d. to 5s. 6d.
Quinces, Imported, per case	...
Strawberries, per tray	4s. to 4s. 6d.
Tomatoes, quarter-case	1s. 6d. to 2s.
Watermelons, per dozen	...
Rockmelons, per dozen	...
SOUTHERN FRUIT MARKET.	
Bananas, Fiji, per case	10s. to 11s. 6d.
,, ,, per bunch	2s. 6d. to 6s.
Lemons, per gin case	...
Oranges, per case	5s. to 7s. 6d.
,, Washington Navels, per double case	...
Mandarins, case	...
Pineapples, case	7s. to 8s. 6d.
,, per double case	7s. 6d. to 10s.
Rockmelons, case	...
Peaches, half-case	...
Tomatoes, half-case	1s. 6d. to 3s.
Quinces, per case	2s. 6d. to 4s. 6d.
Chillies, per bushel	4s. to 4s. 6d.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JUNE.

Article.		JUNE. Prices.
Bacon (Pineapple)	lb.	6d. to 7½d.
Barley, Malting	bush.	4s.
Bran	ton	£5 15s. to £6.
Butter, Factory	lb.	9¾d. to 10½d.
Chaff, Mixed	ton	£4
Chaff, Oaten	"	£4 5s. to £4 6s. 3d.
Chaff, Lucerne	"	£4 5s. to £5 2s. 6d.
Chaff, Wheaten	"	£2 8s. 9d.
Cheese	lb.	6d. to 6½d.
Flour	ton	...
Hay, Oaten	"	£5 5s. to £5 15s.
Hay, Lucerne	"	£3 10s. to £4 10s.
Honey	lb.	2d. to 4d.
Maize	bush.	2s. 4¾d. to 2s. 7d.
Oats	"	3s. 4½d. to 3s. 9d.
Pollard	ton	£5 15s. to £6
Potatoes	"	£6 4s. to £9 18s. 9d.
Potatoes, Sweet	"	...
Pumpkins	"	...
Wheat, Milling	bush.	4s. 1½d.
Wheat, Chick	"	3s. 6d. to 4s. 1d.
Onions	ton	£7 17s. 6d. to £8 5s.
Hams	lb.	9d. to 10½d.
Eggs	doz.	10¾d. to 1s. 1½d.
Fowls	pair	2s. 5¾d. to 3s. 9d.
Geese	"	5s. 1d. to 6s. 1d.
Ducks, English	"	2s. 10½d. to 3s. 3d.
Ducks, Muscovy	"	3s. 3d. to 3s. 9d.
Turkeys, Hens	"	6s. 1d. to 5s. 9d.
Turkeys, Gobblers	"	8s. 9¾d. to 11s. 3d.

ENOGGERA SALES.

Animal.	MAY. Prices.
Bullocks (Extra Prime)	...
"	£8 12s 6d. to £10 10s.
Cows (Extra Prime)	£9
"	£5 15s. to £7 10s.
Merino Wethers	25s. 3d.
" Ewes	16s.
C.B. Wethers	25s. 3d.
" Ewes	19s. 9d.
Lambs	18s. 9d.
Pigs	15s. 3d. to 20s. 9d.

Farm and Garden Notes for August.

Farm.—Now is the time for busy work in the field, work which will produce rich results at harvest time. Clean the crops put in last month. Sow maize for an early crop. Get the potatoes planted as soon as possible, and only plant such as have sprouted. By doing this you get an evener and more certain crop than if the unshot seed is planted. In choosing maize for seed, select the large, well-filled, flat grains. It has been shown that by constantly selecting seed from prolific plants, as many as five and six cobs of maize can be produced on each stalk all over a field. Sow pumpkins, either amongst the maize or separately, if you have the ground to spare. Swede turnips, clover, and lucerne may still be sown, but they will have to contend with weeds, which will begin vigorously to assert themselves as the weather gets warmer. Therefore, keep the hoe and cultivator reguarly going. Plant arrowroot, ginger, and sugar-cane. During this month tobacco may be sown. If vines are available, sweet potatoes may be planted towards the end of the month. If grasses have not yet been sown, it should be done at once. Sugar-cane crushing in the tropical parts of the State will be in full swing this month. Should frost injure the cane in the Southern parts, it should be put through the rollers at once. Rice and coffee should be already harvested ; but the picking of Liberian coffee begins this month. Plough out old canes, and prepare the land for replanting.

In the North, collect divi divi pods. Orange trees will be in blossom, and coffee trees will be in bloom for the second time. As this is generally a dry month in the North, little can be done in the way of planting.

Kitchen Garden.—There is plenty of work to be done now in the vegetable garden, especially in destroying the aphis-infested plants. All spring and summer crops can be put in. Sow carrots, parsley, beet, lettuce, French beans, runner beans of all kinds, peas, parsnips, tomatoes, squashes, cucumbers, melons, pumpkins, sweet corn, egg plant, mustard and cress, cabbage, seakale, kohl-rabi, radish, &c. Plant out rhubarb, horse-radish, herbs, seakale, asparagus, ginger, Jerusalem artichokes, and any cabbage plants which may be ready. Get all the potatoes planted as soon as possible. Attend to the thinning of such crops as require it, such as carrots, turnips, parsnips, &c. Peas should be supported by sticks or wire netting. Globe artichokes may be planted. Keep the weeds down by a free use of hoe and cultivator. As the cabbage and cauliflower beds become finished, plough or dig them up, and, if possible, allow the soil to be exposed to the air for a month or two before putting another crop in it. Pinch tops off broad beans when they come into flower, to make the fruit set. Give plenty of water to all vegetables, especially to cabbages during the dry weather.

Flower Garden.—Ferneries will require overhauling, and top-dressing with a mixture of sandy loam ; some plants will require staking, others thinning out. The roses will have already been pruned, but look at them occasionally, and help them by rubbing off here and there a shoot with a tendency to grow in and crowd the centre of the bush. Plant out antirrhinum, pansies, hollyhocks, verbenas, petunias, &c. Sow zinnias, amaranthus, balsam, chrysanthemum, marigold, cosmos, coxcombs, phloxes, sweet peas, lupins, &c. Plant gladiolus, tuberoses, amaryllis, pancratium, ismene, crinums, belladonna, lily and other bulbs. Dahlias would be more advantaged by placing them in some warm, moist spot, when they would start gently and be ready for planting out a month or two later.

Orchard Notes for August.

By ALBERT H. BENSON.

The planting of deciduous trees should be completed by the end of this month in all parts of the State, but evergreen trees can be transplanted during seasonable moist weather at any time of the year if the operation is carefully carried out. When set out, the young trees must be cut hard back to a height that in no case should exceed 2 feet from the ground, and in warm dry districts half of this height is to be preferred. Cutting back at planting insures a strong and vigorous young growth, whereas by neglecting to cut hard back at planting the future growth, vigour, and symmetry of the trees are greatly impaired if not completely spoilt. The pruning of all deciduous trees must also have been completed; and all citrus fruit trees from which the fruits have or should have been gathered should be gone over carefully, all dead and badly diseased wood should be removed, and any crossing or superfluous branches, or water sprouts, should be cut away. When the trees are badly attacked by scales, this pruning should be severe, in order that the remedies used for dealing with these pests may have a fair chance, as when the top of a citrus tree is allowed to grow like a mat it is impossible to get the spraying material on to the parts where it is most wanted. Spraying should be systematically carried out in every orchard in the State during this and the preceding month, and in the case of fungus diseases on deciduous trees during the following month as well. Spraying is just as essential an operation as the gathering of the fruit; and no fruit-grower who wishes to make fruit-growing a success can afford to neglect it, as it is impossible to breed disease in fruit trees and to grow fruit profitably at one and the same time. A full description of the operation of spraying and of the most approved remedies was published some time ago in pamphlet form by the Department of Agriculture, so that any grower who has not received a copy and who desires to obtain the necessary information may obtain it by writing to the Department. After pruning and spraying, the orchard should be ploughed; so that all weeds and trash can be buried, and also that the land that has been trodden down firm shall be broken up. Use a short American plough that will take a wide furrow and turn it right over. The depth at which to plough will depend on the treatment the orchard has previously received and on the nature of the soil. If the soil is shallow, or if the land has never been worked, then the ploughing must be shallow or the roots will be badly injured; but where there is plenty of soil and a perfect subdrainage, then the ploughing can be from 4 to 6 inches in depth (provided the land has been previously cultivated) without any injury to the trees. In fact, in such soil surface roots are not required, and the trees stand dry weather best when deeply rooted.

Quick-acting artificial manures, such as sulphate of ammonia, sulphate of potash, or superphosphate, can be applied during the month, but care should be taken not to apply too large a quantity at once, as, owing to their extreme solubility, a considerable portion of them is apt to be washed out and lost by heavy rains. In conclusion, one more word about spraying, and that is: Do your utmost to stamp out diseases in new districts as soon as ever they make their appearance. Do not consider any disease too trivial, and that it can be well let alone to a more convenient time, as the more convenient time will not come; but the disease will flourish and spread rapidly, so that what might have been checked, if not eradicated, by half an hour's work will now take the grower all he knows to get the better of it. In spraying, whether for insects or fungi, a knowledge of the pest to be treated, combined with carefulness and promptitude, are the essentials of success.

In notes of this kind it is impossible that they can apply equally to every part of the State, but they will be found to be about an average. Very early districts will sometimes require the notes of a month later, and very late districts those of a month earlier.

LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Allora ...	Central Downs Agricultural and Horticultural Association	J. H. Buxton ...		
Allora ...	The Allora Farmers' Progress Association	P. Donovan ...		
Amby ...	Amby Farmers' Association	W. Jas. Sullivan ...		
Atherton ...	Barron Valley Agricultural, Pastoral, and Industrial Association	G. Bardon	5 and 6 July	4 and 5 July
Atherton ...	The Atherton District Farmers' Association	Fredk. Stewart ...		
Avondale ...	Avondale Farmers and Planters' Association	Edward J. Gayland		
Ayr	Lower Burdekin Farmers' Association	G. S. Mackersie ...		
Ayr	Lower Burdekin Pastoral, Agricultural, and Industrial Association	Philip Grout ...		
Ballandean ...	Lyra Farmers' Progress Association	M. B. Marlay ...		
Beaudesert ...	Logan and Albert Pastoral and Agricultural Society	A. Winship ...	20 June	8 May
Beenleigh ...	Agricultural and Pastoral Society of Southern Queensland	Wilson Holliday ...	15 Sept.	23 Aug.
Beenleigh ...	Logan Farming and Industrial Association	Wm. G. Winnett, Loganlea		
Biggenden ...	Biggenden Agricultural and Pastoral Society	C. J. Stephensen ...	6 and 7 July	5 and 6 July
Birthamba ...	New Hope Farmers' Association ...	G. W. Nixon ...		
Blackbutt ...	Farmers' Progress Association ...	John Dreghorn ...		
Boonah ...	Fassifern and Dugandan Agricultural and Pastoral Association	C. E. Mackenzie ...	17 and 18 May	6 and 7 June
Booyal ...	Booyal Farmers' Progress Association	Thos. Skillington ...		
Bowen ...	Pastoral, Agricultural, and Mining Association	Geo. Turner ...	11 Aug.	17 Aug.
Bowen ...	Proserpine Farmers and Settlers' Association	R. Toogood ...		
Bowen (Proserpine)	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Bowenville (Gordon Vale)	Moola Farmers' Progress Association	Alex. Gordon ...		
Brisbane ...	Horticultural Society of Queensland	F. W. Woodruffe ...	...	24 and 25 April
Brisbane ...	Queensland Acclimatisation Society	E. Grimley ...		
Brisbane ...	National Agricultural and Industrial Association of Queensland	Charles A. Arvier	8, 9, 10, and 11 Aug.	7, 8, 9, 10, and 11 Aug.
Brisbane ...	Queensland Nurserymen's Association	S. C. Matthews ...		
Brisbane ...	United Pastoralists' Association ...	Fredk. Ranson ...		
Brisbane ...	Queensland Chamber of Agriculture	F. W. Peek ...		
Brisbane ...	Queensland Citrus-growers' Asssociation	R. M. Cooper ...		
Brisbane ...	Combined Moreton Association ...	Wm. Ewart ...		
Brookfield ...	The Brookfield and Pullen Vale Farmers, Dairymen, and Fruitgrowers' Association	W. R. Moon ...		
Brooyar ...	Brooyar Farmers' Progress Association	E. Pike		
Buderim	Buderim Mountain Coffee and Fruit-growers' Association	G. O. Burnett ...		
Bundaberg ...	Bundaberg Horticultural and Industrial Society	H. E. Ashley ...		
Bundaberg ...	Council of Agriculture	H. J. Page ...		
Bundaberg ...	Woongarra Canegrowers and Farmers' Association	F. Watson ...		
Bundaberg ...	Bundaberg Agricultural, Pastoral, and Industrial Society	H. J. Page ...	14 and 15 June	26 and 27 Sept.
Burpengary...	Burpengary Farmers' Association ...	F. W. Uhlmann ...		
Byrnestown...	Byrnestown Farmers' Progress Association	Chr. H. Fredriksen		
Caboolture ...	Upper Caboolture Farmers' Association	Jos. Wilson ...		
Cairns ...	Aloombah Farmers' Association ...	N. P. Petersen ...		
Cairns ...	Cairns Agricultural, Pastoral, and Mining Association	J. Reid	7 and 8 Sept.	30 and 31 Aug.
Cairns ...	Cairns District Coffee-growers' Association	L. Battinson ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Cairns ...	Cairns District United Farmers' Association	Wm. Griffin ...		
Cardwell ...	Rockingham Progress Association ...	T. E. Fitzsimmons		
Charleville ...	Central Warrego Pastoral and Agricultural Association	G. M. Bell		
Charters Towers	Towers Pastoral, Agricultural, and Mining Association	A. H. Pritchard ...	31 May, and 1, 2, 3 June	31 May, and 1, 2 June
Childers ...	Isis Agricultural Association	H. Epps		
Childers ...	Doolbi Mill Branch, Isis Agricultural Association	W. T. H. Job ...		
Childers ...	Childers Mill Branch, Isis Agricultural Association	H. Epps		
Childers ...	Childers Pastoral, Agricultural, and Industrial Society	A. Eastaughffe ...	1 and 2 June	14 and 15 June
Childers ...	The Childers Mill Canegrowers' Association	A. Eastaughffe ...		
Clermont ...	Peak Downs Pastoral, Horticultural, and Agricultural Society	F. Leysley		
Clermont ...	Peak Downs Dairymen and Settlers' Association	A. G. Pursell ...		
Cleveland ...	Cleveland Horticultural Society ...	Miles R. Fox ...	14 Oct.	
Clifton ...	Darling Downs Pastoral, Agricultural, and Industrial Association	S. J. B. Just ...	13 Sept.	12 Sept.
Coochin ...	The Coochin Farmers' Progress Association	J. T. W. McLaughlin		
Cooyar ...	Yeraman Creek Farmers' Progress Association	George Seely ...		
Cooran ...	Cooran Progress and Agricultural Association	Thos. Smith ..		
Cordalba ...	Cordalba Farmers' Association ...	J. Jeffrey		
Coulson ...	Coulson Farmers' Progress Association	G. R. Johnson ...		
Crow's Nest	The Crow's Nest Agricultural and Horticultural Society	James Gleéson ...	26 July	24 and 25 July
Cunnamulla	South Warrego Pastoral Association	J. Winward ...		
Dalby ...	Northern Downs Pastoral and Agricultural Association	E. Watt	26 and 27 July	25 and 26 July
Dallarnil Scrub, *viâ* Degilbo	Dallarnil Farmers' Association ...	Vincent H. Jones		
Danderoo ...	Danderoo Farmers' Progress Association	T. Campbe ...		
Deception Bay	Deception Bay Farmers' Association	B. J. T. Liscombe		
Degilbo ...	Degilbo District Farmers' Association	J. P. Laugher ...		
Dulong ...	North Coast Central Association ...	R. Whitecro ...		
Dundowran, *viâ* Maryborough	Dundowran and Takura Settlers' Association	H. J. E. Tooth ...		
Esk	Esk Agricultural, Pastoral, and Industrial Society	Thos. C. Pryde ...	24 and 25 May	29 and 30 May
Eudlo ...	Eudlo Farmers and Fruitgrowers' Progress Association	Walter T. Jeremy		
Forest Hill ...	Forest Hill Agricultural and Progress Association	Wm. Jones ...		
Geraldton ...	Johnstone River Sugar-growers and Manufacturers' Association	Ralph Reid ...		
Gin Gin ...	Currajong and Gin Gin Agricultural and Pastoral Society	J. R. Hamilton ...	24 May	28 May
Gladstone ...	Gladstone Pastoral and Agricultural Association	W. J. Manning ...		
Gladstone ...	Port Curtis Agricultural, Pastoral, and Mining Association	J. T. S. Brown ...		
Gooburrum, Bundaberg	Gooburrum Farmers and Canegrowers' Association	W. J. Tutin ...		
Goombungee	Goombungee Farmers' Association ...	Thos. Smith ...		
Goondiwindi	MacIntyre River Pastoral and Agricultural Society	E. T. Drake ...	...	1 and 2 May
Gracemere ...	The Gracemere District Farmers and Progress Association	Arthur E. Fisher ...		
Gympie ...	Agricultural, Mining, and Pastoral Society	F. Vaughan ...	13 and 14 Sept.	15 and 16 Aug.
Gympie ...	Chatsworth Farmers' Progress Association	W. Allen		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Gympie ...	Deep Creek Farmers' Progress Association	H. Bath		
Gympie ...	Gympie Horticultural Society ...	Charles Brasch ...		
Gympie ...	Imbil Road Farmers and Settlers' Progress Association	D. J. O'Farrell ...		
Hambledon (Cairns)	Hambledon Planters' Association ...	W. L. Hawkins ..		
Harrisville ...	Harrisville Farmers' Progress Association	W. J. Burnett ...		
Haslemore, Victoria, Herbert Riv.	Herbert River Farmers' League ...	Alfred Henry ...		
Headington Hill	Headington Hill Farmers' Progress Association	J. E. Stehn ...		
Helidon ...	Helidon Scrub Farmers' Progress Association	James Sweeney ...		
Helidon ...	Monkey Creek Farmers' Progress Association, Withcott, Helidon	Thomas Turner ...		
Hendra ...	Nundah Agricultural, Horticultural, and Industrial Association	Geo. A. Patullo ...	28 Oct.	
Herbert River	Halifax Planters' Club	A. Campbell ...		
Herbert River	Macknade Farmers' Association ...	Edwin S. Waller ...		
Herbert River	Ripple Creek Farmers' Association ...	J. W. Grimes ...		
Herbert River	Fairford Farmers' Association ...	D. G. Scott ...		
Herbert River	United Farmers' Association ...	D. G. Scott ...		
Herberton ...	Mining, Pastoral, and Agricultural Association	John M. Hollway	...	22 and 23 May
Hodgson ...	Hodgson Farmers' Association ...	Fred. Warner ...		
Home Creek, *via* Wondai	Home Creek Farmers' Progress Association	A. Iker		
Hopetoun ...	Hopetoun Pastoral, Agricultural, and Progressive Association	John Walsh ...		
Hughenden ...	Hughenden Pastoral and Agricultural Association	H. G. McLean ...	19 and 20 June	
Ingham ...	Fairfield Farmers' Association ..	B. Lynn		
Ingham ...	Gairloch Farmers' Association ...	B. Lynn		
Ingham ...	Herbert River Pastoral and Agricultural Association (Agricultural Show)	P. J. Cochrane ...	8 and 9 Sept.	
Ingham ...	Stone River Farmers' Association ...	F. A. Rankin ...		
Ingham ...	Victoria Farmers' Association ...	W. C. S. Warren...		
Ipswich ...	Ipswich and West Moreton Agricultural and Horticultural Society	P. W. Cameron ...		
Ipswich ...	Queensland Pastoral and Agricultural Society	J. McGill	14 and 15 June	20 and 21 June
Kelsey Creek *viâ* Bowen	Kelsey Creek Farmers' Progress Association	A. Fontaine ...		
Kolan, North	Kolan Canegrowers and Farmers' Association	Jas. H. Hendy ...		
Kilkivan ...	Kilkivan District Farmers and Settlers' Progress Association	J. H. McKewen ...		
Killarney ...	Killarney Farmers' Association ...	J. H Hansen ...		
Kingaroy ...	South Burnett Agricultural, Pastoral, and Industrial Society	T. J. Lacey ...	...	3 and 4 July
Laidley ...	Lockyer Agricultural and Industrial Society (at Gatton)	W. A. McIlwraith	13 July	4 and 5 July
Lakeside ...	Mungore Farmers' Association ...	C. C. Ridley ...		
Lillydale, Helidon	The Flagstone Creek Farmers' Progress Association	Danl. Ryan ...		
Longreach ...	Longreach Pastoral and Agricultural Society	J. P. Peterson ...	8 and 9 May	1 and 2 May
Lucinda Point	Victoria Farmers' Association ...	W. S. C. Warren...		
Ma Ma Creek, *viâ* Grantham	Ma Ma Creek Farmers' Progress Association	Joseph Turner ...		
Mackay ...	Agricultural, Pastoral, and Mining Association	F. Black		
Mackay ...	Pioneer River Farmers' and Graziers' Association	E. Swayne	7 and 8 June	20 and 21 June
Mackay ...	The Mackay and District Horticultural Society	Fred. Bourne ...		
Mapleton ...	Fruitgrowers and Farmers' Progressive Association	W. J. Smith ...		
Maroochy ...	Bli Bli Farmers' Progressive and Industrial Association	H. A. Keil... ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1905.	1906.
Maryborough	Maryborough Horticultural Society...	H. A. Jones ...		
Maryborough	The Island Farmers' Progress Association	H. Simpson, junr.		
Maryborough	Wide Bay and Burnett Pastoral and Agricultural Society	A. H. Jones ...	19, 20, and 21 July	23, 24, and 25 May
Miriam Vale	Miriam Vale Farmers' Association	J. Spencer		
Montville ...	Montville Fruitgrowers and Farmers' Progress Association	C. J. Wyer ...		
Mooloolah ...	Mooloolah Farmers' and Fruitgrowers' Progress Association	C. Court ...		
Mooloolah ...	The United Progress Association, Caboolture, No. 1 Division	C. Court ...		
Mosman River	Mosman River Farmers' Association	Geo. W. Muntz ...		
Mosman ...	Mosman District Agricultural Society	G. W. Muntz ...		
Mount Cotton	Mount Cotton and Redland Bay Fruitgrowers and Farmers' Association	W. E. Burns ...		
Mount Marlow	Cannon Valley Farmers and Settlers' Association	R. E. Traill ...		
Mount Mee...	Mount Mee Farmers' Association ...	Jas. H. Robinson ...		
Mount Morgan	Mount Morgan Agricultural, Pastoral, and Poultry Society	J. S. Lyle ...		
Mount Ubi, Eumundi	The Kenilworth Farmers' Association	Alex. Purdon ...		
Nambour ...	The Rosemount Association	George Etheridge		
Nambour ...	Dulong and Kureelpa Farmers' and Canegrowers' Association	A. A. Petrie ...		
Nambour ...	The Obi Obi Farmers and Dairymen's Progressive Association	A. D. Crichton ...		
Nanango ...	Nanango Agricultural, Pastoral, and Mineral Society	J. W. Sigley ...	12 and 13 April	9 and 10 May
Nanango ...	Coolabunia Farmers' Association ...	Ezra Horne ...		
Nanango ...	Malar Farmers' Association	A. Becker		
Nerang ...	Southern Queensland and Border Agricultural and Pastoral Association	H. J. Cooper ...	13 Oct.	14 Sept.
North Isis ...	North Isis Canegrowers' Association	T. E. Barnes ...		
North Pine ...	Moreton Agricultural, Horticultural, and Industrial Association	N. McKenzie ...		
Oakey ...	Oakey Agricultural and Pastoral Society	E. R. Pace		
Palmwoods ...	Palmwoods Industrial Fruitgrowers' Progress Association	H. Taylor		
Peachester, *viâ* Beerwah, N.C. Line	The Peachester Progress Association	R. G. Denny ...		
Pittsworth ...	Pittsworth Pastoral, Agricultural, and Horticultural Association	C. Longland ...	7 and 8 Feb.	31 Jan.
Pomona ...	Pomona Agricultural and Progress Association	H. Armitage, senr.		
Port Douglas	Port Douglas and Mosman Pastoral, Agricultural, Horticultural, and Mining Association	N. Fynn		
Port Douglas	Daintree Farmers' Association ...	J. Carlos Allen Donally		
Proserpine ...	Preston Farmers' and Settlers' Association	R. C. Dagg ...		
Roadvale ...	Roadvale Progress Association ...	Henry Clark ..		
Rockhampton	Alton Downs Farmers' Association...	Thos. Thomasson...		
Rockhampton	Central Queensland Farmers and Selectors' Association	T. Whitely, Coowonga		
Rockhampton	Central Queensland Stockowners' Association	R. R. Dawbarn ...		
Rockhampton	Rockhampton Agricultural Society...	A. S. Tompson ...	16 and 17 June	22 and 23 June
Roma ...	Western Pastoral and Agricultural Association of Queensland	Angus McPherson	18 and 19 July	17 and 18 July
Roma ...	Yingerbay Farmers' Association ...	R. Frederick ...		
Roma ...	Roma Farmers' Association	Duncan Brown ...		
Roma (Blythedale)	Warooby Farmers' Association ...	S. S. Jones... ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1905.	1906.
Rosewood ...	Farmers' Club	P. H. Adams ...	6 and 7 Sept.	5 and 6 Sept.
Sandgate ...	Queensland Beekeepers' Association	A. H. W. Clarkson		
South Kolan	South Kolan Farmers and Planters' Association	John Whalley ...		
Southport ...	Southport Horticultural Society ...	E. Fass		
Spring Bluff	Aubigny Farmers' Progress Association	J. R. Torbock ...		
Springsure ...	Queensland Pastoral Society... ...	G. R. Milliken ...		
Stanthorpe ...	Border Pastoral, Agricultural, and Mining Society	Geo. Simcocks ...	9 and 10 Feb.	22, 23, and 24 Feb.
Stanwell ...	The Stanwell Agricultural Society ...	A. Spanner ...		
Stanwell ...	Stanwell District Farmers' Agricultural and Progress Association	W. Crowe		
St. George ...	Balonne Pastoral and Agricultural Association	T. M. Cummings ...		
Sunnybank ...	The Runcorn and Sunnybank Agricultural Society	S. Robertson ...		
Taabinga ...	The Taabinga Farmers' Progress Association	T. Pass		
Tannymorel, *viâ* Warwick	The Tannymorel Farmers' Progressive Association	Maurice Clifford ...		
Teutoberg ...	Teutoberg Farmers' Progress Association	E. M. Nothling ...		
Tiaro	Tiaro District Farmers' Progress Association	L. H. Riddles ...		
Tinana ...	Tinana Fruitgrowers and Farmers' Association	H. G. Habler ...		
Toowoomba...	Queensland Vine and Fruit Growers' Association	Hy. A. Tardent ...		
Toowoomba...	Royal Agricultural Society of Queensland	G. A. Leichney ...	1, 2, 3, and 4 Aug.	1, 2, and 3 Aug.
Townsville ...	Townsville Pastoral, Agricultural, and Industrial Association (formerly North Queensland Pastoral and Agricultural Association)	J. N. Parkes ...	6, 7, and 8 June	6 and 7 June
Upper Kedron	Upper Kedron Fruitgrowers and Farmers' Association	A. Marshall ...		
Upper North Pine	Upper North Pine Farmers' Association	J. Skerman ...		
Wallumbilla	Wallumbilla Farmers' Association ...	Edmund H. Yates		
Warren Siding	The Stanwell United District Farmers' Union	G. N. Terry ...		
Warwick ...	Eastern Downs Horticultural and Agricultural Association	F. H. Selke ...	15 and 16 Feb.	13, 14, and 15 Feb.
Wellington Point	Wellington Point Agricultural, Horticultural, and Industrial Association	Louis Hugonin ...	15 July	14 July
West Haldon, *viâ* Greenmount	West Haldon Farmers' Progress Association	A. E. Ayris ...		
Wondai ..	Mondure Farmers' Progress Association	W. E. Horne ...		
Woodend ...	Warren-Woodend Farmers' Club ...	W. Lehfeldt ...		
Woodford ...	Woodford Progressive Industrial Association	E. Heaton		
Woombye ...	Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society	P. S. Hungerford...	12 and 13 July	11 and 12 July
Woombye ...	Woombye Fruitgrowers' and Progress Association	E. E. McNall ...		
Woondum ...	Woondum Farmers' and Planters' Association	Chas. E. Gambling		
Wooroolin, *viâ* Nanango	Wooroolin Farmers' Progress Association	A. Deighton ...		
Yandina ...	Yandina-Maroochy Progress Association	Chas. Ablin ...		
Zillmere ...	Zillmere Horticultural Society ...	J. Voigt		

Public Announcements.

The EDITOR will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the EDITOR, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, covers in boards and cloth will be supplied from this office on application to the Under Secretary for Agriculture and Stock. Applications must be accompanied by a remittance of SIXPENCE to cover cost. For the convenience of those who are not within reach of a bookbinder, a Special Cover has been designed, which obviates the necessity for binding. These covers will be supplied at ONE SHILLING each.

In order to avoid disappointment, correspondents who wish for replies to questions in the *Journal* are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

For the information of those who are desirous of communicating with the managers of State farms, we give their names and addresses below:—Queensland Agricultural College, Gatton, principal, J. Mahon; Westbrook State Farm, Westbrook, manager, C. Ross; Biggenden State Farm, Biggenden, manager, D. Macpherson; Hermitage State Farm, Warwick, manager, Alexander Martin; Gindie State Farm, manager, R. Jarrott; Kamerunga State Nursery, Cairns, manager, Howard Newport; Botanic Gardens, director, J. F. Bailey.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

STATE NURSERY, KAMERUNGA, CAIRNS.

RUBBER SEEDS FOR SALE.

The Manager of the Kamerunga State Nursery notifies that SEEDS of the RUBBER-TREE (*Castilloa elastica*), WHICH ARE OF VERY SHORT VITALITY, are available at the Nursery for distribution. As these seeds cannot be guaranteed for more than a few weeks, Immediate Application should be made for them. COCOA PLANTS, raised from last year's seed, can also be obtained.

PRICE OF COCOA PLANTS, 6d. each; a reduction being made per dozen.

RUBBER SEED, 6d. per ounce.

A Small Charge will be made for other Plants, Cuttings, and Seeds. A List of Prices may be obtained on application to the Manager, Kamerunga.

QUEENSLAND AGRICULTURAL COLLEGE.

The College, which is situated within 4 miles of Gatton and 1 mile from the College Railway Siding, comprises 1,692 acres, and the buildings can accommodate 60 Students.

TERMS.

TWENTY-SEVEN POUNDS per annum, paid half-yearly in advance. Students are also charged One Pound per annum each for medical attendance, the sports fund, and for guarantee fee.

The course of instruction includes PRACTICAL AGRICULTURE in all its branches, DAIRYING, GARDENING, STOCK-BREEDING, and MECHANICAL ARTS. Classes are also held daily for THEORETICAL INSTRUCTION in these branches, as well as in SURVEYING, CHEMISTRY, &c.

The College Calendar, giving full particulars, may be obtained on application to the Principal at the College, or to the Under Secretary for Agriculture and Stock, Brisbane.

BURSARIES.

Four bursaries are given annually. An examination for these is held in June or July of each year. Bursaries will be awarded upon the following conditions:—Candidates (males) to be from fifteen to seventeen years of age, of sound constitution, and in good health; they must have resided in the State for the two years immediately preceding the time of their examination for such bursary, or their parents must have resided in the State three years immediately preceding such examination. The bursar is entitled—subject to good behaviour and the pleasure of Parliament—to free board and instruction as a resident student for a period of three years. He is required to take up his residence at the College within one month of the publication of the results of the examination; otherwise he forfeits his right to a bursary.

"THE SHEARERS AND SUGAR WORKERS ACCOMMODATION ACT OF 1905."

The following are the principal provisions of the Act which apply to shearing-sheds, sugar plantations, and sugar works, in connection with which not less than nine shearers or sugar workers are employed. This Act requires that the employer shall provide accommodation proper and sufficient for the shearers and sugar workers employed by him, separate from the shearing-shed or sugar works, and—

1. The buildings used for sleeping must be divided into compartments, each to accommodate not more than four persons;
2. Where persons of Asiatic race are employed, a separate building must be provided for their sleeping accommodation;
3. Two hundred and forty cubic feet of air space must be allowed for each person sleeping in a building;
4. A sleeping-room must not be used for cooking or the serving of meals;
5. When cooking is carried on in the same room as that in which meals are taken, the cooking must be done at one end of the room, and the meals must be taken at the other end. Separate dining accommodation to be provided for all Asiatics employed;
6. In the case of sugar workers, sleeping and dining accommodation must be in a separate building to that provided for Pacific Islanders;
7. Privy accommodation in the case of shearing-sheds must be not less than 25 yards from the buildings and 100 yards from the water supply, and at sugar works the privy shall not be less than 25 yards from the water supply or 100 yards if a cesspit is used;
8. Sugar works dining rooms must be 50 yards at least from open drains for the conveyance of sewage and liquid refuse, and the drain must have a proper fall;
9. The employer is charged with the provision of light and ventilation in the dining and sleeping rooms, the floors of which must be made of suitable material. These rooms must be fumigated and disinfected at least once a year. The supply of good drinking water, cooking and washing utensils, will also be a charge upon employer;
10. The persons using the buildings set apart for the accommodation of shearers or sugar workers have to keep such buildings clean, and if they neglect their duty in this respect after notice in writing by an inspector, the employer may have the building cleaned and deduct the cost from the wages due to those offending or recover in a court of justice, but the amount to be recovered shall not exceed £5 for the expense referred to;
11. Every employer must, not less than a week before the shearing or crushing season, inform the inspector by post, or by notice delivered to his address, of the date of the intended commencement.

Copies of the above can be obtained from the Government Printer, Brisbane—Price, 6d.; posted, 7d.

PURCHASE OF STOCK AND PRODUCE FROM THE DEPARTMENT OF AGRICULTURE.

——:o:——

Purchasers of Stock and Produce, Plants, Seed, &c., from the State Farms and Agricultural College are reminded that Sales from these Institutions are made for Cash only. Persons desirous of making purchases should, therefore, first ascertain the cost of whatever articles they desire to obtain, and remit the full purchase-money when sendiug an order.

By Authority: GEORGE ARTHUR VAUGHAN, Government Printer, William street, Brisbane.

VOL XVII PART 2

AUDAX AT FIDELIS

The Queensland Agricultural Journal

August, 1906.

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SEE PUBLIC ANNOUNCEMENTS.

F.C.W.

Edited by
A. J. BOYD. F.R.G.S.Q.

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THE

Queensland Agricultural Journal,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

Edited by A. J. BOYD F.R.G.S.Q.

VOL. XVII. PART 2.

AUGUST.

By Authority:
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1906.

CONTENTS.

NOTICE.

Queensland Agricultural Journal.

It is hereby notified that the *Journal* will be supplied to all members of Agricultural and Horticultural Societies who do not derive their livelihood solely from the land, on payment, in advance, of an annual subscription of 5s., which will include postage. Schools of Arts will be supplied at the same rate.

Persons resident in Queensland whose main source of income is from Agricultural, Pastoral, or Horticultural pursuits, which fact should be stated on the attached Order Form, will receive the *Journal* free

ON PRE-PAYMENT OF 1s. PER ANNUM,

to cover postage.

To all other persons the annual subscription will be 10s., which will include postage.

All remittances should be made by postal notes or money orders, but where they are unobtainable stamps will be accepted, though the Department accepts no responsibility for any loss due to the latter mode of remitting.

For your convenience an Order Form is attached. A cross on each side of the Order Form indicates to the recipient that his subscription is again due.

Amount of one year's subscription should therefore be forwarded with Order Form, without delay, to the UNDER SECRETARY, Department of Agriculture and Stock, Brisbane.

ORDER FORM.

To the Under Secretary, Department of Agriculture and Stock, Brisbane.

For the enclosed...please forward me THE QUEENSLAND AGRICULTURAL JOURNAL for One Year.*

Name..

PLEASE WRITE PLAINLY.

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....

Occupation..

* State amount according to above rates.

Agriculture.

AGRICULTURAL EDUCATION.

By ALEXANDER MARTIN, Manager of the State Farm, Hermitage.

As most of the public now understand, agriculture is, properly speaking, an art; and although, as in the case of other industrial arts, science offers its cultivators aid and guidance, yet it is unwise to expect sudden and great results from the establishment of scientific schools of agriculture.

Patience is even more necessary to the agriculturist than to the painter. The present system of agricultural education secured at establishments like the Gatton Agricultural College and the Hawkesbury Agricultural College is sometimes sneered at because it does not rapidly turn clever, and sometimes poor, Australians into thriving farmers.

The critic usually forgets that some capital is necessary to successful farming, and, besides, he probably overlooks the fact that the scientific training provided in agricultural colleges opens other doors than that of land cultivation to obtaining a livelihood.

Many old fellow-students of the writer who passed through the full curriculum of an agricultural college are now managers of dairies, cheese factories, cold storage plants, orchards, and other institutions allied to agriculture.

A matter which should be pushed on as far as is practicable in this State is a system of giving to scientific agriculture a permanent basis by its inclusion in the curricula of the public schools of the country, not only with a view to supplying trained young men to fill responsible positions on the land, but also for the benefit of the people at large.

Agriculture is now practised, to a large extent, only by those to whom it has become an hereditary profession, and many of our citizens have learnt to look upon agriculture, which is the backbone of all industries and of prime importance in this State, as an occupation to be avoided. But few, if any, of these worthy people ever think of trying to understand the present conditions of Australian agriculture, and, by comparing it with those obtaining in other countries, adopting such means as are within their reach for local improvement.

Thanks to the farmers who, in spite of difficulties and oppressions in the shape of droughts, pests, mortgages, &c., have stuck to their long-continued hereditary profession (though some are now turning their attention to other kinds of work), food products are still as well grown here as in any other part of the world.

But it is to be feared that such cannot long continue unless a large share of the brains and capital of the country turn to the cultivation of the soil. We must keep pace with the fast-increasing modern developments in agricultural knowledge, and to this end a good grounding in agriculture should be instilled into the youths at our State and other schools.

Many educated men, thinking lightly of service, either Government or private, are now beginning to turn their attention to arts and manufactures, and to such it may be recommended that agriculture should be tried as the least over-done of all the arts, and the one to which natural science is capable of lending most aid.

The first difficulty met with in endeavouring to effect any improvement in agricultural knowledge is the absence of a good education amongst the cultivating classes.

Farmers who do not care to devote their spare time to gaining knowledge of modern improvements in their calling, from publications dealing with agriculture, may be traced to those who in their young days were taken from school at an early age to work on the farm of their fathers, and who evince surprise and scepticism when foreign ideas concerning improvements in agriculture are submitted to them.

Any hints as to the alteration of their old-fashioned methods of cultivation are resisted with a conservatism which can only be attributed to a lack of elementary education.

To remedy this, it would be advisable for our authorities to encourage the teaching of the more obvious principles applicable to agriculture in general in all State schools where the majority of the boys belong to the cultivating classes.

The teachers in these schools should, first of all, be trained in such principles of the collateral sciences as are most readily applicable to the development of the art of agriculture, so as to enable them to explain to their pupils the guiding principles of scientific agriculture; to show by experiments the necessity of plant foods, and give instruction in the processes of manufacture of manures from materials available on every farm; to inculcate the importance of the preservation of forests with a view to the amelioration of climate and the cheapening of fuel; to impress on the minds of the lads the benefits to be derived from the rotation of crops and the selection and preservation of seeds; and to translate to them such new ideas and discoveries as are being made known to the world by experts in enlightened agricultural practice.

Small primers containing an elementary statement of the maxims of agricultural practice might be provided for use in these schools, and the literary teachings therein should be given more of an agricultural aspect.

For successful negotiation with the soil, the youthful farmer will need to fully comprehend the nature of the various difficulties with which the occupation is surrounded, difficulties quite enough to cause alarm even to the long-established occupier of the land.

We are so accustomed to hear of droughts, bad weather, unpropitious rainfall, fungoid and insect pests, &c., as the cause of a depression among the agricultural community, that we are apt to overlook other conditions of perhaps greater weight, such as the incidence of taxes, rents, cost of labour, inaccessibility of markets, the nature and adaptability of particular soils to the crops intended to be grown thereon, the unsuitability or otherwise of the existing methods of cultivation and of harvesting with a view to the attainment of economic results.

All these, and probably many others, have been conspiring together to bring the practice of agriculture into disrepute as a profession for the higher educated class.

Looking at the problems of agriculture from such standpoints, it would appear that the system of education provided for the people is at fault in most countries, but in none more so than in those where the majority of the population are dependent on the produce of their lands for subsistence.

The first steps in renovating and fostering the profession of agriculture must come from the introduction of rational systems of education in our State schools.

The educational codes of our schools should give greater encouragement to studies tending to the enlightenment of rural populations in regard to food production and the relation of the science of rural economy thereto, combined with systematic demonstrations of economical methods of applying science to agricultural practice.

Lads now at our schools should have the opportunity of obtaining sound agricultural instruction in preference to such accomplishments as the classics, algebra, trigonometry, &c., which are so much desired by many parents with the possible idea of improving their sons' social position.

How few of our boys leaving school understand that a piece of land under a certain crop may be made to return several times as much under other conditions and treatment.

The complaint is often heard nowadays that the average young man takes much less interest in work on the land than was the habit of such persons some years ago, but this may be remedied to a considerable extent by inculcating

into the minds of boys at school the importance of going on the land with a knowledge of both the theoretical and practical sides of farming. Many of our farmers would be much better off if they had had these opportunities offered them in their younger days.

So much has been written upon the relative importance of practice and theory as applied to agriculture, but after all said and done, good practice must and always will be in accordance with sound theory.

It is impossible that any system or proposal should be "all very well" in theory and yet not be practical. If the theory is sound, it must be correct; but if false, it is no longer theory, but fancy.

It must be remembered, however, that the farmer has sometimes to deal with unscrupulous fellow-men, with long-continued, unfavourable weather, and frequent annoyances from various causes; and these difficulties can only be met and combated by experience—or, in other words, by practical knowledge.

If the youths of the State have a good grounding in the theory of agriculture whilst young, the practical side of their training will come much easier on leaving school.

With the end in view of giving opportunities to our young men of acquiring a practical and scientific knowledge of farming not to be obtained from the ordinary farmer, it might be well to take a certain number for a course of training at our State farms as well as at the Agricultural College, where, of course, the facilities for learning are much greater.*

As most of the operations of agriculture are an adaptation of those of Nature, it follows that all the changes involved in the phenomena of germination, growth, development of seeds, and final decay of plants, must be included in the proper teaching of agriculture for the student to become possessed of the best methods of improving his future land and crops.

To every one who takes an interest in the operations of Nature the development of every sort of agricultural produce in our fields must be a source of concern.

For instance, what can be more interesting than the growth of a crop of wheat? We see the seed sown, in a short time young plants appear above ground; the seed that had been preserved so long in an inactive state, when exposed to the influence of moisture, warmth, and air in the soil, germinates. The spark of vitality that had lain dormant so long in the seed is awakened, and expends is first efforts in the production of an infant plant, which, on reaching daylight, is able to provide for itself, and collect the requisite food for its future nourishment from the surrounding air and soil.

By the imperceptible yet rapid increase of substance the crop acquires strength and vigour, produces flowers, and finally seeds, which duly ripen and await the harvest.

What can be more interesting than a field of wheat in this condition? Every one must admire such a scene. In contemplating this we naturally reflect on the composition and origin of the produce before us.

We know that the grain of wheat contains flour, but whence comes this flour? It must obviously come from the earth, or the air, or the moisture, or from each of these sources; but what great changes must take place before these materials can become the produce in question!

The ordinary farmer knows that his crop has been chiefly produced at the expense of the soil. But even the farmer, although better acquainted with the practical details of the matter, if unacquainted with a knowledge of the chemical side of agriculture, is at a loss to account for the changes proceeding in the materials under his hands. He, in most cases, cannot tell what the wheat removes from the soil, and why it should not grow with equal vigour year after year, or why a crop of another kind will.

* This has now been provided for, as a certain number of students will receive instruction at the Hermitage State Farm.—Ed. "Q. A. J."

Again, he cannot explain the action of the manure he may use; what it is in the manure that imparts fertility to the soil; and why one kind of manure more particularly benefits one kind of crop.

On these and numerous other points connected with the economy of agriculture the chemistry taught in our agricultural institutions is able to enlighten us, and, in many cases, to afford a clear explanation of the changes attending the various operations going forward on the farm, as well as the principles which regulate those changes.

A move in the right direction has been made by the Department of Agriculture in inaugurating a system whereby young men who may find it impractical to attend the Agricultural College at Gatton can be given the opportunity of gaining an insight into farming at the Hermitage State Farm, and it is to be hoped that in the near future an extension to the other State farms will be found advantageous and desirable.

THE CONSERVATION OF GREEN FODDER AS ENSILAGE.

By P. H. SUTER, Dairy Instructor, Department of Agriculture of South Australia.

We have very frequently impressed upon dairy farmers and stockowners generally the absolute necessity for "making hay while the sun shines"—in other words, preparing for the inevitable scarcity of fodder at recurring intervals. The splendid seasons Queensland has experienced since the great drought will certainly not continue for ever, and for that reason we have advised the conservation of the wealth of fodder which has practically to a great extent gone to waste during our time of abundance. By means of the silo, the terrors of a drought are dispelled; by the aid of the silo the ruin of a lucerne hay crop by constant rain is averted. It is the silo which will enable the dairy farmer to draw his regular monthly cheque during drought or flood, in winter as well as in summer. Farmers should visit the splendid silage pits at St. Helena to understand what conservation of fodder really means. Meanwhile, we commend Mr. Suter's article which here follows to their earnest consideration.

Ensilage is the name given to green, succulent vegetation conserved either in pits or in overground silos, under conditions which do not permit the air to penetrate the bulk of the material; in fact, the success of the process depends upon the expulsion of air from the mass. When we put green stuff into a heap we find that in a short time there is a considerable rise in temperature, due to biological and chemical changes in the plant cells. The work of rendering the green stuff more easily digested is carried on by ferments and bacteria which are present in countless numbers on the plants. A few days after green stuff is put into a silo a pleasant aroma will be noticed. This is due to the formation of lactic and acetic acid, and unless the action of these acids is properly controlled by the expulsion of air from the mass the result will be failure. Anyone can, however, make good ensilage if sufficient care is exercised.

Seeing that ensilage-making has passed the experimental stage, and in most countries is regarded as an indispensable adjunct to successful dairying, it is surprising how rarely we find our landholders adopting this practice to ensure their stock against starvation during scarce periods, especially so when we consider the absolute need which exists in this direction throughout the areas which are so subject to droughty conditions. We have abundant and conclusive proof, not only in our own and the neighbouring States, but also throughout America, of the great benefits the system of conserving green foodstuffs has given to the practical farmer. The official records show that in America the number of silos reaches close upon 400,000. The dairyman that attempts to practise dairying without first ensuring himself against short food supplies by means of ensilage is considered to be courting failure. In Victoria and New South Wales, where the climatic conditions are certainly

more favourable for dairying than with us, we find the dairymen recognise the value of the silage as a food for prolonging the milk yield. Victoria leads the way, mainly through Dr. Cherry, who has followed up the good work of Mr. H. W. Potts in strongly advocating the making of silage; and the Victorian Government has wisely arranged to assist those not possessing the necessary capital to erect silos, by advancing the cost of same, repayment to be made within ten years. This has resulted in many farmers now being able to carry on dairying to profit, where, prior to the manufacture of ensilage, they had a struggle for existence. It may surprise readers to know that in this part of the world it was South Australia which led the way to silage manufacture. Mainly due to the advocacy of Mr. A. Molineux, Messrs. J. L. Thompson of Beefacres, C. Rake of Enfield, J. Bell of Morphettville, and a few other progressive farmers adopted this practice a good many years ago; and, although they spoke very highly of the results they obtained from the feeding of ensilage to dairy cattle, dairymen, as a rule, in this State have failed to follow their example.

Personally, I am convinced that this is the weakest spot in our dairy work, and that the time is not far distant when dairymen will adopt this practice, and the colony be studded with silos. Land values are going up year by year; then we have the subdivision of the estates, making farms smaller, and farmers must aim at getting more out of their land by intense culture. Professor Perkins has stated his intention of erecting two more silos at Roseworthy, as soon as money is available, with a view of largely increasing the carrying capacity of the College Farm.

I do not purpose in this article dealing with the feeding of sheep, or beef cattle, but desire to interest dairymen and others in the direction of providing for ensilage at once by putting in, say, 20 acres of ensilage crop. Palatability and succulence in the food ration are essential to deep milk yields, health of the cattle, and success in stock-raising, but in few countries is dairying so subject to hot and dry conditions during the summer months as is South Australia, nor so short of food supply during the cold winter, especially in the hills and south-east districts during midwinter. Ensilage-making should, therefore, appeal to all. Succulence and palatability supplied to milch cows in England in the shape of root crops cannot so readily be secured in this State; therefore, we must have recourse to other methods, and the only one which will be successful all the year round is properly-made ensilage. I feel almost convinced that lack of succulence in the feed is responsible for that common and dreadful complaint which carries off so many of our dairy cows, and is known as dry bible, impaction, or paralysis. When feeding ensilage we promote an active and vigorous secretion of the natural digestive fluids of the stomach, keeping the milch and dry cattle in good condition, with sleeky coats, and profitable at the bucket. The dry food, comprising natural grasses, hay, straw, cocky chaff, &c., on which so many of our dairy cows are compelled to exist for several months of the year, renders the returns unprofitable. I feel it is well within the mark when I say that the annual loss of dairy and other stock in this State, taking into consideration all things, is at least £10,000 per annum, and is one of the hindrances to progress, many being afraid to restock.

There is far too much dairying being practised in a half-hearted way—it may be termed hit-or-miss dairying, as a sideshow—few evincing intelligence and skill in this most profitable branch of agriculture. Profitable returns are secured only during that portion of the year when natural conditions are most favourable, and spring grasses and pasture are grazed upon. Few food-stuffs, I will admit, are so good or nutritious as these; but dry conditions soon prevail, and occasional showers result in robbing such pasture of its nutriment, leaving poor, innutritious, dry food for the stock to consume. Such food does not possess the ingredients which are required for the execution of various functions of the animal system.

It may be as well to consider carefully the objects of feeding our dairy stock. Let us begin with the young heifer. It is well known that the young animal body requires food to supply material for its growth, but we must look beyond this again, as we must have an eye to the constant wearing away and breaking down of the tissues of the body of an animal. It is the duty of the true dairyman or stock-raiser to have a knowledge of the requirements of his stock. Everyone knows a dairy cow, working at full pressure, requires considerably more food per day than a fat bullock—the constant strain and making of milk demand it. We may, therefore, summarise feeding objects as follows:—To repair waste tissue; to maintain body warmth or heat; to form new tissue; to reproduce young; to supply muscular energy; to secrete milk, &c. Now, a milch cow has all of these to perform. Beef, of course, is not for the consideration of the dairyman. He should confine all his attention and energy to secure a deep and uniform yield of good, rich milk. I am convinced that there is no greater necessity to-day in the dairying world than that of liberal and judicious feeding; it is a cardinal point for dairymen to face, and feeding must go hand in hand with breeding: feeding may be truly termed half the breeding.

We find Denmark, that remarkable little country which leads the van of dairy progress—her exports of produce being worth some £17,000,000 sterling annually—feeding some 205,000 tons of oil cakes, 32,500 tons of maize, and 71,000 tons of bran annually to her dairy cows. It is to judicious feeding Denmark largely owes her success, and it cannot be said she possesses many natural advantages. The average yield per cow per annum is very considerably ahead of other countries. Denmark has useful cows, made profitable by feeding, and it is essential, never mind in what business one embarks, that he secure the most suitable machinery for carrying on to profit. With dairymen this calls for a good cow, which will consume the food given it, and yield profitable results. Many dairymen in this State possess good cows, but fail in the feeding of them, and consequently are not aware how good their cows are. I do not care how well bred a cow may be, she will prove but little better at the bucket than the ordinary scrub cow if kept under such conditions. The results dairymen obtain must depend upon the conditions under which their cows live. The better and more profitable a cow is, the more will she consume and respond to liberal feeding. Outside our city dairymen few can be said to feed liberally or judiciously. Many consider they are feeding their cows when they give a mouthful or two of green feed, or a few pounds of loose hay or chaff, in addition to the pasture. The latter is dry, and will not make much milk, but goes to keeping up the system, fulfilling this, if sufficient is supplied. If results are expected at the bucket, then we must feed bran or lucerne, or other concentrated food, with chaff and ensilage, or root crops, to give succulence.

Again, I find many dairymen allow their cows to run down in condition before they think of hand-feeding them, the cows going partially dry. They then supply good feed, and the result is not much increase in milk, as the food is being utilised in building up the system. During the period a cow is secreting a large volume of milk there is a tendency to decrease the volume of the blood, as the cow draws upon its liquid and solid elements; therefore, we must replace this steady waste, and it is the failure to do this that brings about a decreased milk yield, on account of the contraction of the secreting organs of the udder. Once cows are let down low in condition, they can never be brought back to work so profitably until another calf is born and plenty of good food supplied. Success, therefore, in feeding depends upon supplying the right foodstuffs and plenty, for the value of a food depends upon the nourishing constituents it contains. It therefore behoves everyone engaged in dairying to have some idea of the quantity and quality of the nutritive constituents in the various foodstuffs he intends to use, so that he may select the best for his cows. All dairymen know bran is a good milk-

maker, as also lucerne. Why? Because these foods contain what chaffed hay, &c., does not. I will deal with food values in a later article. Our natural grasses during the spring of the year contain sufficient ingredients in their proper proportion, and, being green and succulent, a cow, if given plenty, will yield heavily. She will consume about 110 lb. per day, but when it is dry she eats much less, and the food is not so nutritious, nor can it be so readily digested. The paunch of a cow will hold from 200 to 300 lb. of food, water, &c., and if the food is succulent it is easily kept constantly moving about by muscular contractions of that organ.

I am satisfied that it is only by conserving suitable crops in a green state in the form of ensilage that we will do away with the condition which exists at the present time in this State—viz., the restriction of dairying to a few picked localities where the rainfall and natural pastures are good. I am certain more silos would be erected if our stock-raisers were more familiar with the principles underlying success. Too many think any green feed will do for ensilage, be it thistles or any rubbish growing about the farm. I admit the saving of this has something to recommend it; still, if we are to have good ensilage, possessing value as a food, then let us grow and conserve suitable fodders for its manufacture.

What are the advantages of ensilage when summarised?:—

1. It is one of the safest investments.
2. It largely increases the productive capabilities of the farm.
3. It gives 3 tons of green, succulent feed, as against every ton of hay.
4. It allows of greater available variety and rotation of crops.
5. It supplies stock with food possessing the same laxative and corrective qualities as green grass.
6. It keeps all stock in good health and sleek in appearance.
7. It prevents impaction or dry bible.
8. It prolongs milking period and increases the yields largely when fed judiciously.
9. It is specially suitable for sheep, cows, and all store stock.
10. It is more easily digested than the same fodder naturally fed.
11. It is the nearest approach to fodders grown during spring time.
12. It will not burn.
13. It requires much less space than same quantity made into hay.
14. It can be harvested when little work is doing on the farm.
15. It can be manufactured in wet weather.
16. It largely increases the carrying capacity of the land.
17. It allows two crops to be taken off the same land in one year.
18. It supplies the great essential succulence to the food ration.

Crops to Grow for Ensilage.

Where maize, sorghums, or any solid-stemmed crops can be grown they are preferable to the hollow-stemmed varieties, being soft and juicy, and result in less entanglement of air; but in our lower north, north, and other districts with less favoured rainfalls, we must grow wheat, oats, barley, &c. With any of the above crops it is well to mix some leguminous plants, such as peas, vetches, tares, beans, by reason of their being highly nutritious, and supplying valuable food ingredients deficient in maize, sorghums, wheat, oats, barley, &c., and we secure a heavier yield per acre.

CROPS FOR ENSILAGE AND THEIR TREATMENT.

When to Cut.

The value of ensilage not only depends upon the crop grown, but largely upon the period of growth at which it is cut. The latter is one of the points wherein the majority of our makers fail, many cutting their crops when too green and juicy, with the result that the ensilage manufactured therefrom possesses too much acid, is poorer food value, and accompanied by a very

objectionable odour. This quality of ensilage is not readily consumed by milch cattle, and if fed to them in the bails it is very liable to taint the milk, butter, and cheese, the very offensive odour given off being readily absorbed by the freshly drawn milk. Where ensilage is made from crops cut at the right period of maturity there is no just foundation for the complaint levelled at it as a tainter to milk, especially when fed judiciously. I have made butter and cheese of first quality from ensilage-fed cows. A test as to the value and suitability of various foodstuffs was carried out at the Hawkesbury Agricultural College, N.S.W., and extended over a period of nine months; 40 lb. of sour ensilage was used as a basis of the ration, and with one exception, concentrates, in the shape of oilcake, linseed, bran, pollard, and various chaffs, were added in different proportions. Four cows were placed on each ration, and the milk was treated from each lot of cows separately, and the creams were ripened and churned under the same conditions. The butters were judged on points as regards flavour, texture, and colour, by three judges, and first place was given to Ration No. 1, which was 40 lb. of ensilage.

MAIZE.

Throughout this State we have not a great area wherein the rainfall during the summer months is sufficient to produce heavy yields per acre of maize, sorghums, millets, &c. Still, there are a few specially favoured areas, where these crops will yield from 15 to 20 tons per acre.

With the aid of irrigation very heavy yields can be secured. Only recently I had an opportunity of seeing a crop of maize standing 11 feet high, which would yield 40 to 50 tons per acre, and a sorghum crop which would yield a similar weight. These were grown at Mr. Sheriff's dairy farm at Fulham, with the aid of irrigation. Maize is unquestionably a splendid fodder for milch cows, whether fed green or conserved as ensilage, as it has a solid juicy stalk, with nice fleshy leaves, and should be the dairyman's main fodder, to be mixed with lucerne, hay, or concentrates, where the climatic conditions are favourable to its growth. As the rainfall in this State is usually light at that time of the year when maize grows, special attention to cultivation is necessary, and I would recommend the following method, which will make the most of the moisture that is available:—Plough the land 6 to 8 inches deep, and harrow twice, till a fine tilth is secured; roll and drill in the seed 2 inches deep in rows 3 feet apart, with about 6 inches between the plants. Harrow after the drill. After the crop is up a few inches the scuffler or cultivator should be kept going between the rows at least once every three weeks until the plants meet across the rows. This cultivation is essential, as it prevents the soil from caking and conserves the moisture.

The best early varieties to sow are Hickory King and Mastodon; late varieties, Red Hogan, Shoalhaven, Horsetooth, and Hawkesbury Champion. If the seed or grains are planted too wide apart in the rows, the stem becomes too coarse. Most feeders prefer closer sowing, which gives a lighter stalk and a heavy yield. Maize is in the best condition for green feeding when the majority of the crop has tasselled, and for ensilage when the cob is in what is known as the dough stage, or when the two lower leaves begin to turn yellow, for at this time it has its greatest food value. Should the season be a very dry one, it is better to cut a shade earlier, as there is less sap in the stalk if left longer.

SORGHUM.

This, like maize, requires the land to be brought to a fine tilth and sown in drills, and kept worked between the rows. This crop is often preferred in some districts on account of its standing frosts better, and because it makes a second growth. Sorghum is not as good a milk producer as maize, as it does not contain as much protein or nitrogenous matter so essential to milk production. When made into ensilage it is more acid, and less easily digested than maize. It is at its best as regards food value when the seed is well formed, but

not ripening. If fed too young it occasionally causes death of stock, especially in the young second growth, or when the growth has been stunted by dry weather.

Cutting Maize and Sorghum.

Where small quantities of maize or sorghum are grown, a handy sledge may be made with an ordinary scythe blade attached. It is made the following size:—3 feet 6 inches long, 20 inches wide, using 3 x 2 inches timber for framework. On to this frame is fixed hardwood boards and a seat for the driver. The blade of the scythe is used as the cutter, being fixed by drilling out a hole at the heel, and fixing with a bolt; another hole is drilled, say at 8 inches from the point of the scythe, and bolted to an ordinary piece of batten. An upright piece of ordinary round iron is conveniently bent, and so fixed to throw the maize or sorghum down as the horse pulls the sledge between the rows. I found this a very handy contrivance in securing the crop being laid evenly, making it easy to handle.

Lucerne

is best made into hay, and should be always cut when about the quarter of the crop is in flower, this being the stage when it has attained its greatest food value. I would only recommend lucerne being made into ensilage during the wet weather, or about the last cutting, which cannot conveniently be made into hay.

Mixed Crops for Ensilage.

In America special care is taken, when growing fodder for silage, to grow various crops which, when mixed, give a valuable ration for milk production and stock generally. The following mixture, known as "Robinson's Mixture," has given excellent results:—Ten tons of green maize, 3 tons of English horse-beans, and 1½ tons of sunflower heads. Area of land required for the above:—Three-quarter acre for maize, ½-acre for beans, and ½-acre for sunflowers. The crop, however, most suitable throughout this State would be any of the cereals mixed with leguminous plants.

When to Cut the Crop.

In order to obtain the maximum food value in any crop grown for silage, the crop must be cut when it contains, roughly, 75 per cent. of moisture, having a maximum of nutriment with a minimum of moisture. Cereal crops should be cut when in ear, or too green for hay. At this period we secure ample succulence, and have the food ingredients most evenly distributed throughout the stems, leaves, &c. If, on the other hand, the crop is allowed to get too ripe, the food ingredients will be concentrated in the seed, rendering the balance of the plant of poorer food value, and lacking succulence. Where cereals are grown with the leguminous plants, it is well to cut the crop with a reaper and binder, and put it through the chaffcutter into the pit. If stack ensilage is made, the bound crop is easier to handle, it packs closer, and can be laid transversely.

Filling the Silo.

I find the method adopted in some places is to put the crop in the silo without chaffing, and in every case there has been much unnecessary waste. Not only is a large percentage of the material mouldy, but the fermentation throughout has not been one that results in maintaining the maximum of food value. The waste often equals 20 to 40 per cent. of the crop ensiled. The cost of chaffing the crop has often been urged as an objection to ensilage manufacture. This is not accepted as a bar by those who have followed the practice, and I venture to say that if once it is tried, and a careful account kept of labour, increased food value, extra tonnage conserved, small percentage of loss, more even pressure, ease of mixing with concentrates, economy of feeding, condition of the stock, their only regret would be that they hadn't previously chaffed their crop. The usual practice is to cart a few extra loads overnight,

ready for a start the next morning; the carts are kept going delivering green fodder all day to the chaffcutter, whether wet or dry, as rain should not prevent carting, nor does it injure the ensilage. The chaffcutter should be set to cut cereal crops $\frac{1}{2}$-inch in length, maize and sorghum $\frac{3}{4}$ to 1 inch. When chaffing into the silo, I would recommend that the green chaff be spread evenly as it falls, and the sides constantly tramped to make it solid; for the flag of the crop generally falls to the sides, being the lightest, and, consequently, during shrinkage does not sink evenly, with the result that it comes away from the walls, admitting air, which creates mouldiness. During chaffing it is a good plan to sprinkle about half a dipper of coarse salt evenly over the surface of the green chaffed crops, at intervals of every 3 feet. This adds special value in affecting better health of the stock.

The quantity to cut will depend upon the crop, the facilities for handling, and the size of the press; but as much as possible should be put in, say 8 to 12 feet each day. Where two silos exist, chaff into each on alternate days. This is for the manufacture of sour or semi-green ensilage, not sweet ensilage, sour being the greater milk-producer. There is no need for thermometers, too much having been said as to the watchfulness required to regulate temperature. Before putting the final lot of stuff into the silo, allow it to stand 30 to 40 hours to sink, then chaff sufficient to stand, say $1\frac{1}{2}$ to 2 feet above the top of the walls, and, if possible, let this be of a more tender and succulent nature, as it packs better, prevents the admission of air, and lessens any chance of the last few feet cut being overheated.

WEIGHTING THE SILO.

The material for weights will be determined according to local supplies available, but whatever be used, it is essential that an even shrinkage is secured. In pit silos, having a cement floor, a good plan is to let in two 6 x 4 inches redgum planks, flush with the cement; at each end of these planks is fixed a strong chain, sufficiently long to allow of its being joined together and screwed down by a racket. The chains are drawn up opposite each other on either side of the pit, and left there until the silo has been filled with green chaffed crop. The green chaff is levelled off on the surface, and covered first with tarred paper, then old bags, on to which can be placed 6 inches to 9 inches of wet cocky chaff, and finally 6 x $\frac{1}{2}$-inch redgum boards are laid across, at right angles to the chains. The chains are then drawn together and screwed down tightly with the ratchet. This is not dead weight; it thus becomes necessary to keep the chains screwed up tightly whenever they become loose.

Where dead weight is used instead of the chains, then place any logs, posts, stones, sand, &c., upon the cocky chaff. The weight required for pits 14 feet deep should not be less than 3 to 4 cwt. per square yard. The greater the depth the less the weight required. Where over-ground silos are erected it is claimed by some that on account of their height, 26 to 30 feet, no weight is required. My own experience does not bear this out; such practice was always accompanied by much waste, but much less weight is required than in pits, 2 cwt. to the square yard being sufficient.

The roofing should be constructed of light timber, and covered with iron or other waterproof material; the frame running on ordinary flanged wheels and angle iron let into the walls of the silos. Where this is considered too costly old straw may be used.

OPENING THE SILO.

It is usual to allow the ensilage to remain in silo for three to four months, it requiring about that time to ensure a complete fermentation. When about to open the silo for the purpose of feeding, the whole surface should be opened up, and 2 inches to 4 inches removed each day. Little, if any, loss from mould occurs if this practice is followed.

Capacity of the Silo.

When about to erect a silo, the dairyman should first consider what are the demands likely to be made upon it, or, in other words, how many head of cattle he intends to feed, and for how long, as upon this will depend the size of the silo. Due allowance should be made also for the feeding of his young heifers and calves. Having decided this, then construct a silo having a diameter sufficient only to cause him to remove from 2 inches to 4 inches per day from total surface of the ensilage. Less than this will, especially in this State, become somewhat dry, and mould will follow.

TABLE I.

Material in Tons required, according to Number of Cows kept, in order to feed 50 lb. to each Cow Daily for Seven Months (210 Days).

Cows in Herd.	Weight Fed Daily.	Tons of Ensilage required.	Period Fed.
	lb.		
1 Cow	50	4¾ approximate	7 months (210 days)
5 Cows	50	24 ,,	7 months ,,
10 Cows	50	48 ,,	7 months ,,
15 Cows	50	72 ,,	7 months ,,
20 Cows	50	96 ,,	7 months ,,
30 Cows	50	144 ,,	7 months ,,
40 Cows	50	190 ,,	7 months ,,

TABLE II.

Approximate Capacity in Tons of Cylindrical Silos, with different Diameters and Depths. Diameter is shown at top of Column. Computed from King's Table, America.

Depth.	Inside Diameter in Feet.							
	10	12	14	15	16	17	18	20
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
20 feet	26·2	37·7	..	...	...	...	...	...
22 ,, ...	29·9	45·9	58·6	67·4	76·5	86·4	96·8	119·6
25 ,, ...	35·8	51·6	70·2	80·6	89·6	103·6	116·1	143·3
28 ,, ...	42·2	60·8	82·7	95·0	108·1	122·0	136·8	168·9
30 ,, ...	46·6	67·2	91·4	105·0	119·4	134·8	151·1	186·6
34 ,, ...	55·8	80·3	109·3	126·0	142·8	161·6	180·8	223·6

The above tonnage was placed into silo in the best condition, and continually allowed to settle for a day or two during manufacture, and weighted. The diameter should not exceed 16 to 20 feet. If such is the case the labour of hauling to outlets is increased. The height of the silo gives a considerable increase in capacity. Note above, 20 feet diameter and 20 feet high holds 119·6 tons, whilst an extra 10 feet high with the same diameter gives 186 tons. This will much depend on condition of the crop.—"Journal of Agriculture of South Australia."

EDUCATION IN RURAL SCHOOLS.

The excellent paper by Mr. Alex. Martin, which appears in this issue, on "Agricultural Education," is more than usually interesting, at this period of Queensland's history, when so many of our fellow-colonists with their families are settling on the land. The crowded-out civil service, legal profession, and merchants' offices, no longer offer either large salaries, fees, promotion, or the means of providing for a comfortable old age to the youth of the State. For those, however, who take up the science of agriculture in earnest, and who are backed with a good agricultural education and a certain necessary amount of

capital, and who are willing to throw their whole energies into the business, there is, despite many drawbacks, an almost certain income and a comfortable competence to be gained. In this connection we will repeat what we wrote some years ago on the above subject, premising that the good work of agricultural instruction in our State schools, and the instruction of the teachers at the Agricultural College at Gatton, has been inaugurated by the Secretary for Agriculture, and good results have even now begun to show the wisdom of this course:—

Whilst we have nothing but praise for the excellent system of State school education throughout the colony, whilst we respect and appreciate at their full value the State school teachers, and the splendid work they have done and are continuing to do in the cities and townships throughout this great territory of Queensland, we believe we are justified in saying that there is still one channel through which the stream of instruction has not yet flowed—a channel which, if once filled and set flowing, will carry the beneficent stream throughout the land, eventually bringing wealth, health, and rural comfort to thousands of homes. This so long neglected channel is Agricultural Education. Let us at once say that we do not advocate a systematic course of instruction in the science of agriculture in the State schools. In the nature of things such a course would be impossible—first, because the time spent at the schools by children in the rural districts is of short average duration, hence allowing an all too brief period for mastering the three R's and a certain amount of geography, history, &c.; secondly, because the teachers were never expected to add agricultural subjects to the ordinary school curriculum, and hence went through no course of preparation, nor were they required to pass any examination in agriculture. We may further point out that whatever pleasure the teachers may personally derive from the cultivation of a piece of land in their spare and holiday times, or from the rearing of poultry and cattle, yet teachers are not farmers. The long course of arduous study and training gone through by them during their pupil-teachership, and whilst passing through the various grades to the higher classes, necessarily left them no time to study agriculture in a practical manner. Instruction of a comprehensive nature in this branch of education can therefore only be given in an Agricultural College, or in Dairy Schools, where all the instructors are specialists in their own particular branch of the various industries coming under the head of "Agriculture."

But, these premises being conceded, we hold that it is quite within the range of possibility to render the instruction imparted in the schools under notice more consonant with the environment of the pupils than is now the case. It can be shown that without altering the curriculum in any way, without adding one single fresh burden to the teachers or pupils, that curriculum can be so handled as to attain the desired end in a manner not only not burdensome, but rather enjoyable to teachers and taught.

What is one of the most important duties of the teacher? Is it not to train the faculties of observation and research in the child? And how can this be better accomplished than by encouraging the spirit of inquiry—the curiosity, we may call it, so natural to every child?

More particularly should children be encouraged to observe the phenomena of Nature, and the results of her operations in the ordinary events of daily occurrence everywhere about them. They should be invited to collect specimens of natural history, and to ask questions about all they see. Wherever possible, they should be encouraged to take a share in beautifying the school premises; they should be allowed to cultivate small plots of ground. Whilst doing this, they would soon discover that certain causes produce certain effects. They would find that their flowers, fruits, or vegetables will not thrive except under certain conditions—such as a supply of necessary plant food, manure, water, heat, or cold. Insect pests would also claim their attention, and in a simple way the intelligent teacher would explain how all this comes about, and how the enemies of plant life are kept in check. Then he could cause them to observe the habits of insects—point out how they act as fertilisers of certain

blossoms. The harmless and dangerous insects and animals would come in for innumerable subjects for object lessons. There is no need for any text-books to be placed in the children's hands; no set lessons should be learned by heart. All should be spontaneous on both sides. The teacher himself would no doubt refresh his memory, or gain some useful information from books; but no book should be employed in conversation on any of these little subjects with the pupils.

One valuable means towards inculcating a love of Nature in the youthful mind is the taking of occasional walks into the country. Everyone knows how children, both boys and girls, will scatter about, following the banks of a stream, or wandering through the scrubs or fields picking up all kinds of insects, flowers, stones, and fruit. All these they should be encouraged to learn something about, not in a dry-as-dust fashion, but in a pleasant, intimate, conversational manner. There is another way of arousing their interest—that is, by stimulating the dormant faculty of imitation latent in most children, but very apparent in some. They should be provided with pencil and paper, or a slate and pencil, and induced to try and copy such specimens as they might find, but the most ludicrous efforts in this direction should be taken by the teacher as seriously as if they were works of art. Nothing so much damps a child's enthusiasm as a sneer. This is the most effective means of crushing the open, child nature. Every little first attempt should be commended, and the pupil helped to improve.

There are all sorts of other ways in which a painstaking teacher can inculcate a love of rural life in the children entrusted to his or her care, but we have said enough for the present. We may state that the above remarks are dictated by actual experience. They are not theory, for we put them into practice for several years, and always with the most encouraging results. Yet the ordinary work of a school was never for a moment disturbed. We therefore maintain that what has been done successfully once can be done and should be done again.

A NEW POTATO.

Scientific experimenting with seed potatoes should be a subject of great interest not only to those engaged in the growing of the tuber for marketable purposes, but also to those who like to have a hobby.

For many years experimenting has been going on at the various agricultural colleges, with varying success. These have shown the great necessity to those engaged in growing potatoes as a marketable commodity, of being fully alive as to the best varieties to select for planting purposes, so as to obtain the maximum results.

The potato to-day produces a very fair proportion of the food of civilised men. Although it was introduced into the British Isles in 1586, it was not generally known till the 17th century. Anything, therefore, that tends to improve the quality of this staple food of the people should receive publicity and encouragement. Having this idea in view, we gladly accepted an invitation recently extended by Mr. Russell Kidd, of Mowbray, near Launceston, to visit his garden and inspect the new potato, the "Gem of the South." The subject has engaged the serious attention of Mr. Kidd for the past twelve years, and his studies and experiments have at last been crowned with success, for he has produced a tuber that will, he claims, if generally adopted, increase the value of the output in Tasmania alone by £100,000 per annum.

Two years ago Mr. Kidd purchased about an acre of ground at Mowbray, on a steep slope overlooking the pretty suburb of Invermay. Twelve years ago Mr. Kidd foresaw that if Tasmanian potato-growers continued year after year to plant the same variety of potato the terrible disaster that befel Ireland in 1847 would surely overtake them. It may be explained that potato seed is quite a different thing from a seed potato. A distinctly new variety of

potato can only be raised in one way—from the seed. This is a tiny grain which is obtained from the apple, or berry, of the potato plant. Hundreds, and even thousands, of these little seeds may be planted, and the tubers from each may be worthless. It is this uncertainty that makes the raising of a new variety such a tedious and disheartening task. However, Mr. Kidd was determined to persevere, and for ten years he continued experimenting without any satisfactory result. His idea was to secure a potato specially adapted to the Australian climate, and anything not meeting that requisite was thrown aside. His method of planting the small seed resembled that followed for onion seed when drilled in. He was thus able to test every year thousands of seeds. In October, 1905, after ten years of fruitless effort, he was gratified to get a plant from the seed which produced the world's record of 42 tubers, weighing 4½ lb. This, Mr. Kidd claims, is the biggest root ever dug in the world from seed. Four pounds weight of these were planted out in two plots; in one case, in unmanured ground, and, in the other, in ground whereon stable manure had been applied three years previously. The results were as follow:—

No. 1 Plot.

Weight of tuber planted, 3 lb. 14 oz.
Number of sets, 40.
Length of row, 59 feet.
Manure, none.
Soil, light and poor loam.
Yield, 307 lb. 10 oz.
Date of planting, 10th November, 1904.
Date of digging, March and April, 1905.
Rate per acre, 43 tons.
Rates of yield to tuber planted, 70 to 1.

No. 2 Plot.

Weight of tuber planted, 2 oz.
Number of sets, 11.
Length of row, 12 feet.
Manured three years previous to planting.
Soil, light sandy loam, overlying gravel.
Situation, cold and shaded.
Date of planting, 15th December, 1904.
Date of digging, 17th May, 1905.
Yield, 62 lb. 7 oz.
Rate per acre, 43 1-5 tons.
Rates of yield to tuber planted, 501 to 1, the weight of seed sown.

This, Mr. Kidd states, is not only the world's record for a first tuberation, but is the world's record for any tuberation. Professor Maldon, a great English authority, states that "it is possible" to get 200 times the weight of seed sown, but the above figures show that his estimate has been beaten by over 300 per cent.

Mr. Kidd invited the fullest publicity, and the digging took place in the presence of about fifty representative gentlemen, comprising farmers, seedsmen, commercial men, and journalists. Illustrations (not reproduced here) show the result of the first root of the "Gem of the South" dug up; a second shows result of each stalk of the 11 sets, and the third is the total of 62 lb. 11 oz., or 501 times the seed from the first tuberation. From that little seed sown in October, 1903, Mr. Kidd has this year planted out 13,000 sets, and from a close inspection the yield should be phenomenal, as, even in this dry season, the tubers are already bulging through the earth. The potatoes are planted in 27-inch rows, and 12 inches apart. They were put in 4 inches deep, with ordinary stable manure and 3 cwt. of phosphates to the acre, and have since been earthed up to 14 inches.

Besides being hardy and prolific, Mr. Kidd considers the new potato will be more drought resisting, by reason of its dense foliage, which covers the ground better than any known variety.

As an experiment, one whole potato, weighing $5\frac{3}{4}$ oz., has been planted. This has been gradually earthed up until it is now a huge mound, and on 10th February the stalk measured 8 feet 6 inches across by 7 feet 4 inches wide, and was still growing. As 43 lb. from one root won the prize at the London National Show in 1905 (raised by Mr. Gemmell, of Hauulton, Scotland), it will be interesting to watch what Mr. Kidd's huge plant will return.

The chief characteristics claimed by Mr. Kidd for the "Gem of the South" are as follow:—

Flower, deep purple.
Colour of tuber, purplish red.
Cropping power, phenomenal.
Growth, vigorous.
Haulms, very luxuriant, up to 10 feet in length.
Shape and flavour, excellent.
Flesh, white.
Texture, fine and clean.
Cooking and table qualities, excellent.
One would think that this discovery would be of general interest.
Disease-resisting power, not proved.
Keeping quality, perfect.
Tubers, medium in size and very numerous.—"Farmer and Grazier."

THE CULTIVATION OF PASPALUM GRASS.

Although our Queensland dairy farmers, as a rule, are quite aware of the valuable properties of the grass known as *Paspalum dilatatum*, there are still many who are taking up land for dairying purposes who are debating whether they should plant this grass or *Panicum muticum*, or the expensive Rhodes grass. To such we would recommend the perusal of a pamphlet on the cultivation of paspalum, by Mr. B. Harrison, Barringbar, N.S.W. The pamphlet is too long to be reproduced here, but subjoined we publish a letter written by that gentleman to the "Tweed Times," from which journal we take it. Mr. Harrison writes:—

All stockowners are aware of the great value of good fodder plants, and after many years' experience and observation of this marvellous grass, which appears to thrive well and yield abundantly in all soils and situations, I do not think I can make a mistake in saying that to your graziers and dairy farmers it would prove one of the greatest boons with which they could possibly become acquainted. After about twelve years' experience, *Paspalum dilatatum* has become the favourite grass with the farmers on the north coast of New South Wales, Australia, and to the dairymen especially it has proved a veritable mine of wealth; and can be converted, if necessary, into hay, ensilage, or chaff.

It produces an immense amount of succulent herbage, which is eagerly relished by all stock; grows from 5 feet to 10 feet high; bears a large quantity of seed, which can readily be disposed of at a good price; and thrives well almost anywhere. No other grass can equal it for rapid growth, quantity and quality of herbage, and its adaptability to almost any soil or climate; and the person who introduces this grass into his district will prove a benefactor not only to the locality in which he resides, but the country generally. Any land on which paspalum is established is worth from £10 to £20 per acre.

Once established, this grass remains permanent for all time, and saves the farmer from the great annual expense entailed in the purchase and cultivation of other grass seeds. In the Tweed district (N.S.W.) the seed is sown after the scrub or other growth has been felled and fired, at the rate of about 10 lb. to

15 lb. of seed per acre. Where there is much moisture the grass will, within a few months, be several feet high, and laden with seed. In the dry districts the seed should be sown in autumn, when the weather is cooler, and when there is a probability of getting rain.

This grass has proved very effectual in preventing and subduing noxious growth of all kinds, and to those landowners who are troubled with the persistent and expensive growth of ferns or thistles, &c., it would prove a great blessing; but it should not be sown on land intended for the cultivation of other crops, as it is a very prolific seeder, and when once established is very difficult, if not impossible, to eradicate. There are good paddocks of this grass on the Tweed that have been in existence for the past ten or twelve years. It has been known to yield, at the Wollongbar Experimental Farm, on cultivated ground, when four months old, 22 tons of green fodder, and several successive cuttings of over 13 tons each per acre, within the year. On fairly rich soil, where there is a good rainfall, this grass should easily sustain one bullock, or ten sheep, per acre, and from 50 to 100 pigs could be kept in good condition on a few acres, with the addition of some skim milk or other feed. All persons who have used it for this purpose speak very highly of it.

It is almost impossible to calculate the extent to which it has enhanced the value of all property, and a large area of land which a few years ago was considered absolutely worthless has, through its cultivation, become of great value, and is now producing large profits, and it has given a great stimulus to settlement and enterprise. It has done more for the prosperity of the north coast than any other variety of fodder could possibly have done, and it has also been the principal factor in making our dairying industry—which has now assumed immense proportions—highly profitable, and the lands on the north coast famous throughout the world. Land which a few years back could have been purchased for a few pounds per acre is now worth from £10 to £25 per acre, and the reserve price in some instances has been fixed at £30 per acre. This famous plant resists the evil effects of frost, drought, or flood more effectually than the other varieties, and will preserve its verdure when all other grasses would be scorched or dried up with the summer heat and the frosts of winter. To prove the truth of these statements, I shall quote from a few of our leading authorities:—

Of this celebrated grass W. S. Campbell, Esq., Director of Agriculture, N.S.W., says:—"This grass has attained such remarkable prominence, and so many persons have become acquainted with its great value, and so much has been written about its merits, that anything one can write upon the subject seems to be superfluous." He also says, speaking of its introduction:— "Gradually the farmers took to planting it, and as its excellent qualities became known the demand for seed and plants became enormous, and its name has now become familiar to every man, woman, and child, not only in the Richmond and Tweed River districts, but all over the coastal districts of the State."

The same gentleman, who recently visited these districts, said to a Sydney reporter, "That he, like others who had been here, had returned greatly impressed with the prosperity of the people. The paspalum grass in many places was 5 to 6 feet high, and it was difficult to see the cattle in it. Indeed, if the grass stood up straight, it would be impossible to see them. As it was, only their backs were visible, and he believed that it would support five or six head of stock for several months. Land was realising large prices, and he thought it would go still higher."

Mr. Varley, editor of the "Clarence and Richmond Examiner," says of this grass:—"It is a wonderful fodder plant. Given a sufficiency of moisture, it will flourish in all classes of soil. I have seen it luxuriating in swamps, with water over its crown; in the big scrub in its glory; on the sandy barren wastes of the seashore; but nowhere have I seen it grow with greater luxuriance than

on the forest ridges. A few years ago the Richmond was threatened by a weed called the "Mullumbimby couch." Cattle fell away on it, and many died. Since the introduction of paspalum this weed has had notice to quit. As in quality, so in growth, as compared with other grasses—it is paspalum first, the rest nowhere. An energetic man, backed up by *Paspalum dilatatum* and cows, is almost sure of success. Take the 'Big Scrub' of the Richmond as a case in point. Fifteen years ago this magnificent tract of country was practically in its primeval state. It was equally provided then, as now, with steam communication to Sydney. No point of it was more remote than 15 miles from water carriage. Yet no progress was visible. Five years later the railway from Lismore to the Tweed was opened. From that day the jungle began to disappear, and to-day the whole face of the country is altered, *Paspalum dilatatum* being substituted for scrub, and dairy cows for paddymelons. One butter factory alone, which opened with the advent of the railway, has increased its output from 1 ton a month to 350 tons a month. A herd of cows will easily average £10 per head per annum. One farmer (resident in the Coramba district) published his receipts for one year, which showed a credit balance of £600. His area was only 160 acres."

This is what Mr. C. F. Julius, Secretary, Dairymen's Union, Bucca Creek, says in the "Government Agricultural Gazette," N.S.W.:—"This remarkable plant is quickly coming to the forefront as a grass peculiarly adapted to our uncertain climate. Being a deep-rooter, its properties as a drought-resister alone proclaim it invaluable; and while, throughout the warmer seasons of the year, it surpasses all other grasses in the rapidity and abundance of its growth, the severest of our frosts, although retarding its growth, fails to subdue its evergreen state. It is most efficacious in subduing and preventing the growth of all noxious weeds. By the assistance of *Paspalum dilatatum* many lands hitherto deemed worthless in their rocky, hilly, or swampy situations, have been triumphantly reclaimed."

The "Agricultural (Government) Gazette" says:—"Throughout the length and breadth of the northern dairy districts paspalum grass is regarded as the king of pasture grasses, and at present it has, no doubt, every claim to such a position."

Mr. H. Munsey, of Dundas (N.S.W.), says:—"Paspalum is the grass that has revolutionised the dairying industry on the north coast. Scores of instances can be quoted showing that the capacity of farms has been doubled and trebled, and it forms a dense mass of succulent forage. Having spent over a month going through farms where this grass has been sown, I can safely recommend its planting on a large scale. I have seen farms where 100 head of dairy cattle have been kept all the year round on less than 100 acres of land, giving splendid returns in milk and butter. This grass, if enclosed for a short period during autumn, will provide a good supply of feed for the winter. Its value to the State cannot be expressed in thousands of pounds."

Mr. Brandon, the well-known manager of the North Coast Co-operative Butter Factory, says of paspalum:—"I do not know what this district would have done without it, especially during the very dry weather we experienced some time back. With regard to the quality of the butter manufactured from it, it is all that could be desired."

This factory, which was established about ten years ago, and is owned and controlled by our farmers, for the month of January last paid away to its suppliers for cream and pork the immense sum of £44,500, "or at the rate of half a million" per annum. Nearly all the cows from which the milk is obtained for this factory are grazed on paspalum, and very few of them are either hand-fed or housed during the winter months.

Mr. Jas. King, President of Tweed River Dairymen's Union, says:—"That to write of the merits of paspalum would require a newspaper."

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE.

Returns from 1st to 30th June, 1906.

Name of Cow.	Breed.	Date of Calving.	Yield of Milk.	Per cent. Butter Fat, Babcock Test.	Commercial Butter.	Remarks.
			Lb.		Lb.	
Clare ...	Jersey	22 April, 1906	626	5·2	36·46	
Angel ...	Holstein-Devon	11 April ,,	876	3·6	35·32	
Mona ...	,, Sh'rth'rn	16 Jan. ,,	926	3·4	35·26	
Linnet ...	Ayrshire	12 May ,,	898	3·4	34·20	
Dora ...	Shorthorn ...	29 May ,,	886	3·4	33·74	
Lass ...	Ayrshire	15 Mar. ,,	831	3·6	33·51	
No. 1 ...	Shorthorn ...	11 May ,,	879	3·3	32·49	
Jeanie ...	Ayrshire Sh'rth'rn	21 April ,,	753	3·5	29·52	
Nettle ...	Shorthorn ...	18 April ,,	655	3·6	26·41	
Cocoa ...	Jersey	9 Oct., 1905	411	5·6	25·32	
Mince ...	Ayrshire Sh'rth'rn	22 April, 1906	645	3·5	25·28	
Magpie ...	Holstein Sh'rth'rn	4 Feb. ,,	634	3·5	24·85	
Bliss ...	Jersey	3 May ,,	581	3·8	24·73	
Beatrice ...	,, ...	22 Jan. ,,	390	5·6	24·46	
Poppie ...	Guernsey-Jersey	11 Feb. ,,	506	4·3	24·37	
Kit ...	Shorthorn ...	17 April ,,	650	3·3	24·02	
Chocolate ...	,, ...	27 Oct., 1905	512	4·0	22·94	
Blank ...	Jersey Ayrshire	17 Dec. ,,	487	4·2	22·91	
Carrie ...	Jersey	13 Nov. ,,	392	5·0	21·95	
Belle ...	,, ...	4 Oct. ,,	337	5·6	21·14	

RICE CULTIVATION.

It has been conclusively shown that rice can be profitably grown on the coast lands of Queensland, yet, despite the profitable nature of the industry, as exemplified at Pimpama in the South and at Cairns in the North, Queensland farmers do not seem to take any interest in rice-production. In the United States, however, the farmers grow immense quantities of rice. True, they employ Japanese labourers on the swampy coast lands, but in this State we grew mountain rice by white labour. It sold at 6s. per bushel, and the average crop was 40 bushels per acre, and, under favourable circumstances, 60 bushels. Yet Queensland imports all the rice she needs, whilst producing maize at 2s. 6d. and 3s. per bushel. H.M. Consul at Galveston, Mr. H. D. Nugent, reports that in the cultivation of rice the Carolinas and Georgia have of late been completely overshadowed by the newer fields of Louisiana and Texas. The swampy lands on the coast of the Gulf of Mexico in these two States have been found to be peculiarly suited to the growth of rice, and land that was a few years ago thought to be almost valueless is now sold at high prices. Additional impulse has been lent to the industry by the presence of several colonies of Japanese, skilled rice cultivators, and more of them are expected. There are already several hundred of these Japanese. The progress of the rice industry in Texas can readily be seen when it is stated that in the report issued by the Secretary of Agriculture at Washington in December last, out of a total of 460,198 acres under rice cultivation in the United States in 1905 no less than 432,286 acres were in Louisiana and Texas; 237,900 acres in the former and 194,386 acres in the latter. Texas produced 6,025,966 bushels, of an average value of 1 dollar per bushel; and Louisiana 6,137,820 bushels, of an average value of 89 cents per bushel. As yet, however, there is comparatively little rice exported from Texas, the bulk being grown for home consumption.—"Foreign Office, Annual Series, 3,585."

The Horse.

UMBILICAL HERNIA, OR RUPTURED NAVEL.

This disfigurement has depreciated the selling value of many an otherwise sound colt, and no breeding season passes without such cases coming under our notice. In some districts it is much commoner than in others, and would appear to be due to climatic causes quite as much as to hereditary. An eminent French authority has stated that 5 per cent. of foals, both horses and mules, bred in France, suffer from this deformity. The bulging navel may be observed at birth, or develop later; it may be congenital or acquired. It may disappear without interference, or remain during the whole of the animal's life.

The congenital form is produced during intrauterine life, when some part of the digestive and biliary apparatus is situated within the umbilical cord. The connective tissue of the fœtus is in this region gelatinous, and in it are embedded the arteries and vein alluded to in connection with a former paper, describing the causes of leakage from the navel, also the emphalo-mesenteric vessels and a portion of intestine. With the withering of the navel string after birth, this (Whartonian) gelatine undergoes condensation, ultimately forming a dense fibrous membrane, for the especial purpose of closing the umbilical opening, contracting by degrees, until the edges are brought together, and nothing remains in the adult but a lozenge-shaped scar or cicatrix. During this process in the normal subject, the portion of intestine has been withdrawn and the urachus withered to a thin ligament, and the blood vessels obliterated.

Any interruption to the processes above described may result in the enlargement we call umbilical hernia, or ruptured navel. The cicatrisation, or formation of a scar of dense fibrous tissue, may have been prevented, hindered, or temporarily interrupted, so that the opening in the belly (umbilicus) remains, and through it bulges a portion of omentum, or intestine, or both, together with some portion of urachus, forming a pouch in the skin which may alone restrain it. The non-appearance of it for a few days is easily accounted for by the emptiness of the new-born, their sides being hollow, or what we commonly call "tucked up" when speaking of horses. When the young animal has distended himself with milk, and some amount of flatulence follows, the belly contents take the least line of resistance, and ruptured navel is discovered.

Accidental or acquired hernia is not rare. It is brought about by the wild gambols of the young while yet the processes above described are incomplete. Many of our readers will have heard, and some, like the writer, will have seen, colts a few days old leap a hurdle which they will never after be capable of negotiating. They will, too, have observed that they are better at taking off than at landing, and are apt to come down a "buster" on the other side—a real literal "buster," for it is in such moments that the soft and immature substance covering the umbilical opening gives way. The excitement of a foal when the dam is first taken away has resulted in this form of hernia. It has also followed upon the straining of constipation, the relaxation of tissues caused by diarrhœa, and the spasms of colic.

There is a predisposition in underbred animals to this trouble on account of the unwillingness of the gelatine to undergo the metamorphosis we have attempted to describe, while in thoroughbreds there is an activity or disposition to the organisation of higher (denser) tissues. It follows also that in poor, ill-used, anæmic mothers, a tissue debility will be frequently imparted to offspring, and this soft material refuses to be converted. It has been observed that wet years are followed by more cases of umbilical hernia, and

that they are more frequent in low marshy lands than on higher and drier soils. On the former the greater volume of moist food will, of course, induce greater abdominal distension, which favours rupture. Heredity is an undoubted factor, mares which have been ruptured as foals have been observed to reproduce the trouble in their progeny.

CONTENTS OF THE ENLARGEMENT OR TUMOUR.

We have said that in some cases there is nothing but the skin to restrain the abdominal contents from escaping at the umbilicus. This is noticeable in puppies, for in them the ordinary belly lining (peritoneum) has been broken through, and the skin so stretched that it is semi-transparent. As a rule, in the larger animals, the peritoneal lining remains unbroken. The tumour itself varies greatly as to the presence and amount of intestine, of omentum, or other structures contained, and herein is the surgeon's difficulty and the amateur's pitfall.

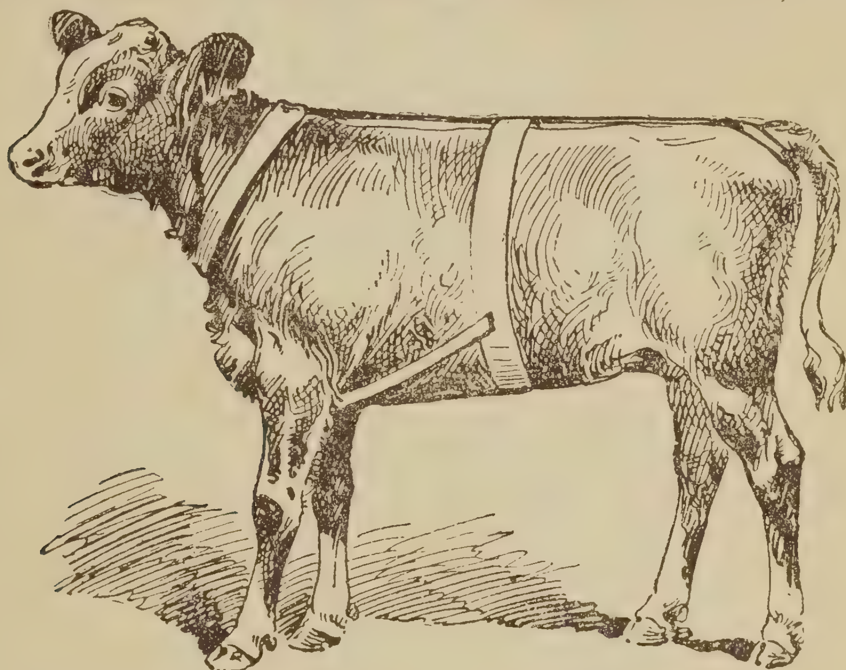
TREATMENT.

It so often happens that the pouch of skin contains nothing but omentum or abdominal fat of a particular kind, that rash operators succeed on one or more occasions, and, being ignorant, and growing careless, presently perform on a subject with intestine in the bulge. The result is fatal. Each case should be very carefully and fully examined, both in a standing and prone attitude. A full animal on his feet, or when made to cough, will show the enlargement at its greatest. A comparatively empty youngster in a recumbent posture may scarcely show it at all; but these ruptures vary in size from a walnut to a child's head. As a rule, the tumour can be pushed back into the abdomen, through its ring, and there retained by a finger or two until the patient coughs or fixes his diaphragm in efforts to escape the unwelcome examination. So far, its permanent return is shown to be possible. Next, it should be gently pulled upon, as one draws a cow's teat, and while the animal is standing. Such manipulation will give to sensitive fingers and trained observers a sensation conveying a fair notion of what is inside. If it is all fat and fibrous tissue it will impart a more or less doughy feel to the fingers, and even leave a momentary depression like certain forms of swelled legs in horses. If gut is in it, and that not full of alimentary material, the sensation of compressing a partly filled bladder will be imparted to the finger; it is also possible to feel the ordinary creepy (vermicular) movements of the bowel, which is always going on.

The animal should be examined twice, the first time without preparation, the second time after a considerable fast. The latter condition makes palpitation a better guide to diagnosis, the empty bowel being more compressible and elastic, returning quickly after compression, and not remaining doughy or receiving a temporay finger mark. The reader will appreciate the importance of these distinctions since a correct estimate of the contents of the sac will almost ensure a safe and successful treatment, while a mistake is likely to prove fatal. If there is doubt as to the contents of the sac, and the animal is only a few weeks old, it will be advisable to wait and watch if the rupture seems to remain the same size, increase, or diminish. If it remains about the same, more time may be given. If decidedly decreasing, let well alone; but if visibly enlarging, operation must be resorted to.

Spontaneous recovery is due to the fact that during the sucking period the small intestine is not only the most developed portion, but it occupies the floor of the abdomen, immediately over the weak umbilical ring. As the diet changes from milk to solid food, the small intestine is withdrawn into the left flank, and its place upon the floor of the belly is occupied by the cæco-colic mass of bowel, which does not readily lend itself to extrusion through a small orifice or weak place. By this gradual withdrawal closure is invited and usually takes place, although there always remains on close examination a slight bulge in the contour of the abdomen.

Unless some special reason exists for early interference, such as an approaching show, the matter should be deferred until the autumn, when the animal is stronger and better able to bear surgical operation. Mr. Armatage and others have secured considerable success with a truss which bears his name, a rough sketch of which is here given, but I have not found it free from objection or so useful as other means, where no sort of shifting harness is required, and the movements of the animal are not so likely to interfere with their operation. Simple pressure, continuously applied, that would keep the extruded parts within the abdominal walls as effectually as we can with our fingers do it temporarily, would be all that is needed. This discovery leads to bandaging; the medical man, with infants to deal with, who can be



so frequently "trussed" and generally controlled, at once supposes that a bandage is all that is needed. There are thousands of people who would thank him to show us how to keep it in its place. Armatage's truss has not yet been improved upon for the purpose. Marlot proposed a truss suggestive of a little saddle, with broad and strong girths, passed outside of a horse-hair cushion, applied over the rupture.

What may be called a breast harness, and a breeching, are added, and can be effectively illustrated in the lecture-room on a "lay" figure, but in practice, when the animal lies down, it is slack in one place and tight in another, while rubs and galls are difficult to avoid when any apparatus has to be worn for a length of time. The Massiera truss used in Italy consists of a cushion covered by an iron plate, and maintained in position by double straps passing under the chest, round the body, and with a crupper to keep it from drawing forward. Strauss and other trusses are but varieties of the same thing, and all need to be kept on for about three months, during which the youngster often gets into trouble—it would take a whole "F. & S." to describe them.

The successful practices of old farriers of using strong mineral acids can be traced back to Celsus, who wrote in the 1st century, A.D., but whose Latin descriptions of surgical operations betray his reliance upon the much older writings of the Greeks. He was not himself a practitioner, save an an amateur, treating his own dependents.

These bold practitioners dab the base or margin of the tumour with nitric or sulphuric acid by means of a mop made of cotton wool or spun glass, and rub it in with moderate friction. A scar forms, and a lot of swelling

ensues. The tumefaction is due to the action of the nitric acid on the subcutaneous connective tissue, which is infiltrated, and causes a uniform pressure on the hernied mass; this leads to the latter being pushed into the abdomen and kept there as if by a truss. The skin subsequently becomes dry and hard like parchment. In place of the hernia there is a newly-formed hard mass of fibrous tissue, which is gradually lessened by absorption of the softer portions, and condensation of the remainder, just as one sees in a fresh and in an old scar on one's own hand. Like all heoric remedies, it has its risks, and a too liberal use of acid may so injure a thin skin as to allow the gut to break through with a fatal result. For puppies it should never be employed, and anyone but an experienced veterinary surgeon attempting this operation should begin by spots of acid around the base. An interval of three weeks should be allowed if the swelling proves that the acid has been too cautiously used before making another application. Some practitioners prefer sulphuric acid; their method is to draw lines over the tumour with a glass rod dipped in the strong acid. Others use an ordinary blister of biniodide of mercury. This is safer, and not much less reliable than the strong acids, but may need repetition in a fortnight if the navel is seen to be again disposed to bulge.

A French method, advocated by Bouley, will commend itself to many. It consists merely of injecting a solution of common salt into the connective tissue immediately under the skin by means of a hypodermic syringe, such as are used for injecting calves suffering from husk. This acts as an irritant, and produces the same œdematous swelling as the other remedies, and with like results.

There are cases in which none of the foregoing will serve so well as constriction by ligature, clams, or suture. The skin covering the hernia may be so manipulated as to enable one to pinch it up, apart from its contents, and wind a more or less tight string around it, or place a clam of wood or metal on it, or run a needle through and tie the thread, or wooden skewers crossed and wound round with twine in a figure of 8. They all act by setting up a form of inflammation which first produces fluid, and subsequently organised tissues of a fibrous material, admirably calculated to form a stopper to the hole in the belly, and afterwards, by its own gradual contraction, to bring the edges of the walls together. Too great pressure from either the above measures will endanger sloughing and the escape of the intestine. The modest fee usually charged by veterinary surgeons for operating on navel hernia is well bestowed, but there are many of our readers, not only in British colonies but scattered all over the world, who must either undertake these jobs themselves or let them alone, as the great ranches are too wide for a veterinary surgeon to be available, and a hundred miles often separates the animal owner from the animal doctor.—"Farmer and Stockbreeder."

CORNS ON HORSES' FEET.

Corns in horses are not excrescences, but are due to bruising of the angle of the sole by the heel of the shoe, and what is wanted is not ruthless paring, but the prevention of further injury. Hunting, in his "Art of Horse Shoeing," says:—"A corn, be it remembered, is not a tumour or a growth; it is merely a bruise of the sensitive foot under the horn of the sole. It shows itself by staining the horn red, just as a bruise on the human body shows a staining of the skin above it. To 'cut out a corn' with the idea of removing it is simply an ignorant proceeding. If a corn be slight, all that is necessary is to take off the pressure of the shoe, and this is assisted by removing a thin slice or two of horn at the part. When the injury is very great, matter may be formed under the horn, and, of course, must be let out by removal of the horn of it. Provided there is no reason to believe that matter has formed a corn—that is, the bruised and discoloured horn—should not be dug out in the ruthless manner so

commonly adopted. Cutting away all the horn of the sole at the heels leaves the wall without any support. When the shoe rests upon the wall it is unable to sustain the weight without yielding, and thus an additional cause of irritation and soreness is manufactured. The excessive paring of corns is the chief reason of the difficulty of getting permanently rid of them. The simplest device for taking all pressure off a corn is to cut off $1\frac{1}{2}$ inches of the inner heel of the shoe. With the three-quarter shoe a horse will soon go sound, and its foot will then resume its healthy state. The saying 'once a corn always a corn' is not true, but it is true that a bruised heel is tender and liable to bruise again, from very slight unevenness of pressure, for, at least, three months. All that is necessary is care in fitting and abstention from removal of too much horn from the part."—"New Zealand Farmers' Weekly."

THE CHINESE PONY.

Tartar ponies have always been noted for their wonderful powers of endurance. The following instances were given to a representative of the "Townsville Evening Star" by a young Victorian who lately returned by the "Nikko Maru" from Shanghai, to which port he had travelled with some twenty well-bred horses for sale. After pointing out that the market there was, on his arrival, overstocked with Russian horses, which were being sold after the war, and which, although a good stamp of horse, were poor in condition, and only brought prices ranging from £15 to £16, he went on to say:—The China ponies, which ranged from 13 hands to 13·3, were simply tireless, and could carry or pull remarkable weights. In a Victoria with three passengers inside, two men on the box seat, and one hanging on behind, one pony could keep going for hours at a pace which it would take a good horse to keep up at a trot. Ridden, they were the greatest rogues, but the most tireless animals, and have mouths like iron. "Some of the things I am going to tell you, you will find difficult to believe, but they are facts," remarked the tourist. "At the races at Shanghai one of the ponies bolted seven times round the course, and then lined up and won the Shanghai Derby. I saw him an hour later in his box, and he stood up on his hind legs and pawed the air.

"At a horse show over there, too, one of the little brutes was in the jumping contest. He had three bits in his mouth, but he got away and went round the ring, taking the jumps till the people got tired of looking at him. Won it? He must have won it for the next ten years, and then he didn't look distressed. He was a little brute that seemed to be all the colours of the rainbow, something like a zebra."

This brand of ponies, our informant stated, came from Mongolia, and it was very difficult for a foreigner to purchase a mare, and almost impossible to secure a stallion.

WHITEWASH THAT WILL NOT RUB OFF.

A first-class whitewash is made by dissolving 2 lb. of ordinary glue in 7 pints of water, and when all is dissolved, adding 6 oz. of bichromate of potassium, dissolved in a pint of hot water. Stir the mixture up well, and then add sufficient whiting to make it up to the usual consistency, and apply with a brush in the ordinary manner as quickly as possible. This dries in a very short time, and, by the action of light, becomes converted into a perfectly insoluble waterproof substance, which does not wash off even with hot water, and at the same time does not give rise to mould growth, as whitewash made up with size often does. It may be coloured to any desired shade by the use of a trace of any aniline dye or powdered colouring, while by the addition of a small proportion of calcic sulphite its antiseptic power is much increased.

Poultry.

THE CHICKEN INDUSTRY IN ENGLAND.

Our English exchanges give some very interesting information as to the methods adopted by chicken-fatteners in Sussex, methods which might, with modifications, be well adopted by poultry-keepers or dealers in Queensland. It does not follow that because a business carried on in a certain way will pay in Europe that therefore it will pay on the same lines at the antipodes, but neither is it safe to say, on the other hand, that such methods will not pay here. We have in Queensland the very best breeds of poultry to be seen in the world, but it must also be confessed that there are still on many farms some mongrel cross-breeds which would disgrace the products of the Arab incubator huts about Cairo and Alexandria. We take our information, in this instance, from "The Farmer and Stockbreeder," which often supplies us with most valuable suggestions on methods of stockbreeding and on other matters which might have been written especially for the benefit of Australian breeders. On the Sussex chicken industry that journal writes:—

With the chicken-rearing season in full swing it is worth while to call attention to what the Sussex poultry-fatteners are doing, and describe their methods for the benefit of readers who have never been over a Sussex fattening establishment. The output of dead fowls despatched from Heathfield and Uckfield—the two railway stations which take practically the whole of the trade—is steadily increasing. Last year over 2,000 tons of fowls are said to have been sent away, chiefly to London, though the Sussex seaside towns absorbed a portion, and notwithstanding these were not all reared locally, yet the number of poultry kept in East Sussex must be enormous.

Not only is Sussex famous for the quantity of fowls it sends to market, but also for their quality. The best Sussex fowls invariably obtain the highest price of the market, and even the inferior ones—which are Welsh, Irish, or Midland grown, and only fattened in Sussex—generally sell for the same price as the best Essex, or Lincolns, or Devonshires. The reason is twofold. If the chickens are reared locally they are Sussex fowls, which is not quite the same thing as the Sussex fowl of the Sussex Poultry Club, and in all cases, whether reared or merely imported, once the bird goes into the fattening pen it undergoes the fattening process in charge of a man who thoroughly understands his business, and can put more flesh on a bird than most.

The Fattener's Fowl.

If the fattener's fowl is not quite the same thing as the exhibition Sussex fowl, that is merely because the fattener, caring nothing for colour of plumage, crosses and recrosses to get what he wants—a big white-legged fowl of the Dorking type, square bodied and white fleshed. In rescuing the Sussex fowl from utter oblivion as a recognised breed, and in encouraging breeders to keep it, the Sussex Club is doing a good work. But it is not so much the Sussex fowl as the Sussex methods which I wish to describe. The term "Sussex or Surrey" is used by the market indifferently to describe the fowls which come from Sussex, and these are not invariably Sussex fowls. For instance, last time I went over a big fattener's establishment most of the birds he was fattening came from Ireland, and were pure or three-quarter Plymouth Rocks, yet when dead the market would call them Sussex fowls.

Chicken-rearing in Sussex is almost entirely given over to women on the farms—sometimes the farmer's wife, more often the wife of one of the labourers, while almost all the latter keep a few fowls of their own, and supply the higgler with chickens the year round. One curious fact about the whole industry is the homely tools they work with, the cheap coops and sleeping houses, the absence of incubators and rearers, except on a few up-to-date

farms—in a word, the small amount of "plant." Let me hasten to add that in this respect they should not be imitated. It is only the Sussex hen-wife who can rear chickens successfully with such primitive shelters, and the secret of her success is, I believe, chiefly due to the strict attention to detail paid to the chickens. Nowhere are they so carefully looked after. If it is rainy weather sacks protect the coops and keep out the wet; if the weather is hot and dry "nettle tea" is made for them; and if it is cold and windy shelter of some sort is supplied.

Not infrequently a great many chickens are reared on the roadside. This feature is, I believe, peculiar to Sussex, at any rate in the extent to which it is carried on. The reason for this is simply that the chicks belong to a labourer's wife, and their garden is entirely devoted to growing vegetables. The road is the only place where the coops can stand, and fortunately for the hen-wives there is often a strip of grass between the road and the hedge. This makes an ideal rearing ground. They get shelter in the hedge and grit from the roadside, plenty of fresh land to run over, and no adult fowls to interfere with them or steal their food. So they thrive apace.

The stock of one of these contributors to a big fattening establishment will consist of about half a dozen hens and a male. The latter is changed every two years or so, to prevent the stock getting inbred. The sleeping house is generally a lean-to erection upon the cottage, and the stock birds have their liberty. All the eggs are kept for incubation, or rather none are sold unless there is no hen to take them, egg-selling being entirely subordinated to chicken-rearing. While early in the year the hen is not given more than twelve eggs, and sometimes less, fifteen is the regular number in summer, and broods of fifteen chicks hatched from a sitting of fifteen eggs are far from uncommon in Sussex.

The feeding consists almost entirely of Sussex ground oats—a local product, the oats being ground between stones shaped in a peculiar way. Husks and all are pounded up into a meal as fine as flour. The oats, I regret to say, are usually foreign, as they are drier. Home-grown grain soon clogs the machinery—at least, so the millers say. A small quantity of barley is usually ground along with the oats. It is said that the meal is frequently adulterated with ground rice, but really good ground oats should consist of nothing but pure oats and a small proportion of barley. If mixed by itself it is sticky, but with sharps added, if skilfully mixed, it can be converted into a crumbly mass. Many breeders, however, prefer to feed it by itself, mixing it rather moist, and feeding it on a board to ensure it not being trodden into the ground and wasted. In this case the chickens get no water to drink except in very hot weather, when the hen-wife collects nettles, boils them, and gives the fluid when cold to the chicks to drink. This is also given to the fattening fowls, as it is a valuable blood purifier.

Early Feeding.

When the chickens are hatched they get no egg-food, and very seldom biscuit meal; dry grain, too, is not given. They are started on the ground oats, and some get nothing else. Curiously enough, in this part of Sussex, buckwheat used to be grown to some extent, but none is cultivated now. Buckwheat is the grain used by the French to rear and fatten poultry, while our breeders keep to oats. Nests are usually made on the ground, and the chickens coming from healthy stock, reared and treated in a natural way, hatch without any difficulty. At twenty-four hours' old they are moved out into the open with their mother, and the latter put in a coop. Hen and chickens then get a feed of ground oats, put on a board in front of the coop. The first few days they are fed five times a day, but this is soon reduced to four, and then to three. On this simple diet and treatment they thrive, and at a week old are as big as many chickens seen elsewhere when three weeks old. When they are old enough the higgler comes and buys them for fattening. The price he gives varies according to the season.

The approximate prices realised for Sussex fowls when sent to market are as follow—I should add that one big salesman, at least, quotes higher prices than those I am about to give, but the quotations following are the general prices made (per fowl):—January, 3s. to 4s. 6d.; February, 3s. to 4s. 9d.; March, 3s. to 5s.; April, 3s .to 5s. 6d.; May, 3s. 3d. to 6s.; June, 3s .3d. to 5s. 6d.; July, 3s. to 5s.; August, 2s. 6d. to 4s.; September, 2s. 6d. to 4s.; October, 3s. to 3s. 6d.; November, 3s. to 3s. 6d.; December, 3s. to 4s. 6d.

These prices are for fattened fowls, when the fattener has done his best with them; when he buys them lean, he gives from 2s. to 3s. 6d. a chicken, but the difference between the price he gives in early spring and in the autumn is more marked than the quotations suggest—in other words, the chicken which sells for 2s. in the autumn is much older and bigger than the bird which he will give 3s. 6d. and even occasionally 3s. 9d. for earlier in the year.

The fattener is sometimes a rearer himself, but in all cases he buys largely and in some cases entirely all he fattens. He is really a manufacturer, who buys an article in its raw state and turns it into a finished product. He purchases the lean, running chicken, and after about a month's treatment it goes to market a fattened fowl. It will be interesting to see how this is done.

The fattener is almost always a farmer as well; but a unique sort of farmer, in that the principal stock are the fowls, and all other farm work subordinated to the needs of the chickens; he keeps cows, but the main reason why this is done is to have milk for the chickens—milk being of extreme value for fattening purposes. The poultry manure is used for the grass land. Judiciously applied, poultry manure is very valuable, and in this case it is obtained without any trouble, as they merely have to collect from under the fattening coops.

These fattening coops, or cages, are of a peculiar pattern, made entirely of narrow wooden bars or laths. They are some 7 feet long, divided into three compartments, and will at a pinch hold eighteen chickens, but not more than four or five will be put in each compartment unless the fattener is crowded for space. They are raised some 3 or 4 feet from the ground, and the floor, like the rest of the coop, being barred, the droppings fall through and are easily collected. In summer the coops stand out of doors and have very little protection from the weather, but for winter fattened fowls a shed is best for the fattening coops to stand in. Some of the smaller fatteners have no sheds, and make shift by putting up wind screens to protect the fowls and using coops with solid roofs.

Into these coops the lean chickens got at any age between ten and sixteen weeks; probably they have never been confined in their lives before. They have run loose about the place till the higgler—*i.e.*, the fattener—comes and takes them. The term "higgler" is rather a misnomer. It usually means to bargain or haggle over a price; but the higgler does not bargain; he fixes the price, and the chicken raiser has to take it. The extent to which prices vary I mentioned just now. The higgler pays ready money, and on the whole the system of buying is fair to both parties, though the raiser often thinks he does not get enough.

The first thing to do to the chickens when they are in the coops is to leave them alone for twelve hours or so; thus let them get thoroughly hungry before feeding them. This makes them take more readily to trough feeding, and they do not fret and lose appetite. Small troughs are hung in front of the coops, and into these is ladled a mixture of ground oats, milk, and fat, of a consistency of porridge. It is made as stiff as possible, always keeping in mind that it must not be so stiff that the chicken can lift a piece with its beak. They are fed either twice or thrice a day, at regular hours, and after they have eaten all they can the troughs are removed, so that thy get nothing to eat till they are fed again. The fat used is rough beef or mutton fat boiled down, or Australian mutton tallow is employed. This kind of feeding goes on as long as

the chickens are disposed to eat readily—a period which usually lasts about a fortnight—but presently they go off their appetites, and if kept longer under the same conditions will go back in weight. Then the cramming system begins.

The cramming machine is a kind of iron funnel set on wheels to facilitate moving it along between the pens. To the funnel an indiarubber nozzle is attached, and through this the fowl is fed. The operator touches a treadle with his foot, and the food is forced out of the machine down the fowl's throat. The food, by the way, is the same kind the fowl has been eating before. The speed by which they are fed, when a skilled man is working, is simply amazing to the novice looking on. The *modus operandi* is as follows:—The fowl is taken out of the pen, the crammer tucks it under the left arm, and with the right slips the nozzle into the mouth and well down the throat; then he presses the treadle with his foot, and the crop fills automatically. The second it is full, and the operator keeps one hand on the crop to judge this, he takes his foot off the treadle, extracts the nozzle, and puts the bird back in the pen. In the days before the cramming machine was invented the fowls were crammed with pellets of meal, as they still are in France. The enormous saving of time by using the machine needs no pointing out.

Though cramming cannot be called very pleasant work, no cruelty to the fowls is involved, and as a proof of this, the fattening chickens are always in the pink of condition. Moreover, they put on flesh during the ten days or fortnight the process lasts in a remarkable way. But the day comes when the fattener sees that the chicken is technically "ripe." It is then fasted for twenty-four hours, killed, plucked, and sent to market. It is not, of course, necessary to cram fowls intended for market; but to get the best results and the best prices it must be done. Fowls killed after a fortnight or so in the coop feeding themselves are merely "half-fatted," to use a market expression. Practically all the Sussex fowls that go to market are machine crammed, but only a portion of those that come from other parts are so treated, and the difference in price they fetch showed the value of cramming.

LADY FARMERS.

We ("Mark Lane Express") can imagine the joy of the ladies on hearing the president's profession of a high regard for their opinions on agricultural matters.

Earl Carrington, presiding at the annual meeting of the National Poultry Organisation, thus expressed himself on the subject of lady farmers:—

In horticultural circles the lady gardener is looked upon as being quite a new introduction, but this is not so in agriculture, for the lady farmer is half as old as time itself. It is true we do not train lady farmers in collegiate establishments, and turn them out chock full of science to compete with the mere men practitioners, but the lady farmer is a power in the land nevertheless. It would be impossible to say how many cases there are in which farmers have died and left widows with the place on their hands, and the latter, instead of giving up in despair, have put their shoulders to the wheel and successfully carried on the business. We do not say it out of mere compliment, because the fact remains that, in many cases, the judgment of the wife in farming matters has turned out better than the husband's; and when we see a woman at the death of her better half not shrinking at the responsibilities, but facing the situation, and assuming the reins of control on a farm, we emphasise our statement that the lady farmer is a commendable figure in agriculture.

The Orchard.

THE BANANA.

The banana has thriven in Queensland for some fifty years. It has been and is to-day being grown on the coast lands from the Tweed Heads to Thursday Island. We have seen it also on the arid Western lands, where only a few inches of rain fall during the year. Here, however, the plants were irrigated by bore water. The principal varieties grown are Cavendish, Sugar, Ladies' Fingers, and in some parts the Plantain. In North Queensland a variety has been propagated at the Kamerunga State Nursery, which has not as yet met with much appreciation, as it is valueless for fruit production. What fruit the plants do bear is small, triangular, full of black seeds, and scattered sparsely over the extremity of the fruit stem. This is the *Musa textilis*, the Abaca of the Philippines, from which the world-renowned Manila hemp is produced. With that, however, this article has nothing to do.

The Cavendish banana, a Chinese variety, is the one most universally grown in Queensland and Fiji. This was introduced by the great missionary, John Williams, from the Duke of Devonshire's conservatories at Chatsworth, into Fiji, whence the Rev. G. Pritchard carried it to the Tonga Islands, and eventually it found its way to Queensland, and now forms a very important item amongst the exports of North Queensland.

The banana thrives admirably, and is grown on a fairly large commercial scale at Buderim Mountain, Mooloolah, Mount Cotton, and other localities in the South. It seems almost superfluous to say anything to Queensland farmers and fruit-growers about the methods of planting and cultivating a plant so universally grown in the State, but we have been requested to do so by a correspondent at Gladstone, and we therefore give the following short notes, which apply generally—not to any particular district.

In the old days, forty years ago, when our scrub farms were first cleared and the soil was all of the rich texture of a scrub turkey's mound, all we did was to make a hole on the banks of creek or river, put in a banana sucker, and wait till next year for fruit and abundant suckers. The plants grew amazingly fast, and, notwithstanding that the leaves were blackened and cut by the winter frosts, the yield of fruit was very heavy, whilst the prices rarely fell below from 4d. to 5d. per dozen wholesale. The banana being liable to suffer from frost—the Cavendish variety less so than others—a plantation should be located either in frostless districts, such as on high land or on the sea coast—or a location should be chosen sheltered from westerly winds. The soil must be naturally very rich, or else should be made so by heavy manuring. The plant delights in the sea air, the salt of which is drawn into the sap of the plant, which contains a considerable percentage of sodium chloride. It can be well understood that, owing to its juicy nature, moisture in the soil is as necessary to the plant as moisture in the air, hence, as a rule, the low lands are better suited to it, and the low lands of the North not being subject to frost, but having a moist, warm climate, with the atmosphere impregnated with sea salt, are the best suited to bring the banana to perfection. Geraldton and Cairns are instances of this in the North. Swampy land, however, is quite unsuitable to the banana; pure sandy soil is also to be avoided, and returns can only be expected on rich but dry country when irrigation is resorted to. The plants for forming a banana grove are suckers, which grow profusely from the roots of the mother plant. These are cut off deep below the surface with some sharp instrument like a draining tool, when they are about 2 or 3 feet in height. The young leaves at the head are cut off. The ground must be well prepared for their reception, by ploughing and harrowing, and digging out holes at least 1 foot deep and 1 foot or 18 inches square. The distance apart

of the plants depends upon the variety planted. In Florida and the West Indies, dwarf varieties are planted 8 ft. apart in every direction. This is certainly the minimum distance; 10 feet is preferable in the case of Cavendish bananas, and 12 to 15 feet for tall-growing varieties. The young sucker is placed in the hole at about the full depth. If the soil requires manure, it should be thoroughly well rotted and mixed with the filling-in soil. In newly-felled scrub land, holes are made somewhat larger, owing to the tangle of roots to be taken out. When the land is ploughed, there will be no trouble in keeping the land clean while the plants are young, and on unstumped land weeds must be kept down with the hoe. Once the plants have begun to bear, cultivation of the soil usually ceases. Every stem which has borne fruit is cut down, chopped in pieces, and scattered round the base of the clump. This is, however, a practice not to be recommended. Banana stalks will remain for a year buried in soil which is not always damp, and may then be dug up almost intact. Furthermore, the worn-out stalks lying on the ground form a splendid breeding-ground for insect pests. At Cairns, where the Chinese plantations are not cultivated, I have seen thousands of these stalks lying between the rows. It is quite possible to believe that the larvæ of the fruit fly find a safe refuge under these stems, which may account for the propagation of the pest.

Although we stated lately in an article on sisal hemp that perhaps the only other crop which did not receive cultivation was the banana, this was not meant to imply that the banana should not be cultivated. All plants are benefited by cultivation. What was meant was, that most growers do not cultivate the banana groves. If they did so, and removed the useless stalks to a pit or heap, and attended to keeping down superfluous suckers, the insect pests would be fewer, light and air would be better enabled to reach the soil, and the plants would thrive better and produce heavier bunches. From three to four suckers are enough to allow for future bearers, and as these grow towards maturity three or four more are allowed to come on, and so a continuity of bearing stalks is provided for, whilst at the same time their strength is not diminished by the production of dozens of useless suckers.

When the fruit has attained its full size, and before it ripens, the bunches are cut off, and the stalk which produced them is cut down. The bunches should be carefully handled, and not thrown violently on the ground, a proceeding which not only bruises the fruit but causes a loss by breaking off of "hands." The bunches will get rather too much of such violent handling in railway trucks and in the holds of steamers.

There is nothing more that we need say on the subject, as banana-growers are to be met with on all coast lands, and a novice can easily learn what to do by studying their methods.

FRUIT-TREE PRUNING AT WESTBROOK EXPERIMENT FARM.

By ALBERT H. BENSON.

In a former issue of the Journal I gave an illustrated description of the principles of fruit-tree pruning, especially as regards the training of the young tree for the first three seasons; and the photographs, which are reproduced herewith, show how this method of pruning has been carried out by me in actual practice at the Westbrook and Hermitage Experiment Orchards, which were planted in 1897.

The illustrations on Plate I. are as follow:—

1. A Gravenstein apple-tree planted in 1898. This tree, when set out, consisted of one straight stem, which was cut back to a height of 20 inches, and the four branches shown in the illustration were allowed to develop, all others being removed by summer pruning. It will be noted that each of the four branches has a firm hold of the main stem, and that there is, therefore, no likelihood of splitting.

2. Shows the same tree, pruned.

3. A Monroe's Favourite apple-tree planted in 1897. This tree was treated in a similar manner to No. 2 last year, the height to which it was cut back being easily seen in the illustration. The tree made a vigorous growth, and was summer-pruned in December last, a small amount of disbudding having taken place previously. The effect of the summer pruning is shown by the development of fruit spurs, which is taking place along the main branches, and by the formation of the tertiary forks.

4. The same tree, pruned. It will be noted that no fruit spurs have been removed, but that the tree has been thinned out by the entire removal of superfluous branches, and has been cut back to outside buds, so as to spread the head of the tree during the coming season. The tree as pruned is well protected from sunburn, and will come into fruit early.

The illustrations on Plate II. are descriptive of—

5. A Bartlett pear-tree, William's Bon Chrêtion, planted in 1897. This tree was treated in a similar manner to No. 2 in 1898, the extent to which it was then cut back being clearly shown in the illustration. It was summer pruned last December, this latter pruning developing the fruit spurs on the older wood, and forming the tertiary branches. It will be noted that the tree is well balanced, and that the formation of narrow forks has been prevented, each branch having a firm hold of the main or primary branches.

6. The same tree, pruned. Being an upright grower, it is cut back to outside buds. No fruit spurs are removed, but superfluous branches have been cut right away.

7. A Lady Palmerston peach-tree, planted in 1897. This tree was cut hard back last winter, and the only treatment it received last summer was a little disbudding early in spring, and the shortening in of straggling growths about Christmas time.

8. The same tree, pruned. It will be noted that a large quantity of wood has been cut away, and that the laterals have been carefully thinned and shortened in. This severe pruning is necessary in the case of the peach in order to produce large fruit, for if the trees are insufficiently thinned out they will poduce a large number of small-sized fruits which are valueless for canning or drying. The tree, as pruned, will only carry a few fruit this coming season, but will produce strong fruiting wood for next year's crop. The pruning of the Persian varieties of peaches requires considerable judgment in this State, owing to the fact that many varieties only produce their fruit buds on the extremities of the branches. Hence, if all laterals were cut back hard you would have no fruit at all. With such varieties, a systematic thinning out of superfluous branches without cutting back gives the best results. Chinese varieties of peaches, however, require to be both thinned out and cut back, as they are prone to overbear and produce small, unsaleable fruit.

CULTIVATION OF A NEW KIND OF POTATO.

The British Vice-consul at Rouen (Mr. C. B. C. Clipperton) reports that the cultivation in France of a new potato, brought from Uruguay, has been observed for some time with great interest. A variety of this potato, called the "Solanum commersonii violet," is said to possess excellence of taste as well as a nutritive value, and is equal to the best table potato known in France. This variety is distinguished by its resistance to frost, as also to disease, and its one great advantage is that it prospers most in a damp or swampy soil, where no other kind of potato would grow. Every kind of soil, whether clayey, calcareous, or silicious, seems equally adapted for its culture, provided it is damp. The price of this potato, which has now been placed on the market in a limited quantity for planting purposes, is 2s. per lb. (Foreign Office, Annual Series, 3,586.)

Plate VII.

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1st Plate.

Fruit-tree Pruning.

Plate VIII.

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2nd Plate.

Fruit-tree Pruning.

Viticulture.

A LESSON IN PRUNING VINES.

By E. H. Rainford.

The Time for Pruning.

The vine should not be pruned before the new wood has well summered and the sap has ceased to flow—two points of easy ascertainment. They should not be pruned after the sap has begun to move in the spring, unless for a special purpose. One purpose to be attained by doing so is to prevent injury by frost to young shoots of early-sprouting varieties, in districts where late frosts are to be apprehended. By pruning the vine when the sap is on the move, and the eyes are beginning to swell, the expansion is checked by as much as a fortnight in some cases, and injury by late frosts is avoided. Some are of opinion that late pruning does not harm the vine. It is true that, in many cases, no ill effects are noticeable either in the fruit or shoots; but that the loss by bleeding at the pruning sections can be anything but harmful is the writer's firm conviction.

Manner of Pruning.

Some writers advocate cutting the canes across the knot above the bud left for vegetation. They argue that, unless cut in this way, moisture may accumulate inside the severed cane, and cause rot and injury to the bud below. In this State, such a danger is not to be feared with the limited winter rainfall, and, in long-noded varieties of vines, this method of pruning would leave an unsightly amount of long dead wood, which would cause injury to shoots and bunches in windy weather; an inch from the bud will be long enough. When pruning away suckers and canes not required for new spurs, always cut away as close to the stock as possible. The cut will heal better, and there will be less sprouting of fresh suckers at that point. Always cut away any dead wood from last season close to the green wood, to avoid wood-rot.

The Object of Pruning.

The object of pruning a vine is to get as much fruit from it as possible without impairing its health and vigour. To do this, a balance must be maintained between the crop taken from the vine and its producing power. If you allow too many bunches to be developed, the vigour is diminished, and the bad effects will show later on; if too small a crop is allowed to develop, the vigneron suffers a loss, and a superabundance of wood is made. On the fertility of the soil, the climate, and other physical conditions will depend the amount of crop to be grown—the vine itself will tell you how much.

The art of the pruner consists in directing and managing the vigour of the vine, and getting the most benefit from it; in other words, a maximum of fruit instead of a maximum of wood and leaves. A few of the laws which govern this art may be given here for the guidance of the pruner:—

1. If the vigour of the vine is diminished, its production of fruit is increased up to a certain point.
2. A cane will produce more fruit the more it departs from the vertical position.
3. The vine shows most vigour at the points furthest from the stock.
4. The greater the number of shoots the weaker they will be individually; and, conversely, the fewer the shoots the greater the vigour of each.
5. The more abundant the fruit the less the saccharine matter in it.

There are many ways of pruning, each of which has its admirers and advocates, but they are all variations of two systems—long and short pruning.

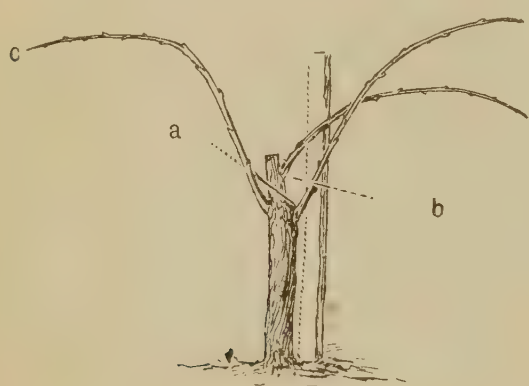
Long pruning consists in leaving a cane with six or more eyes for the production of fruit, and called the fruit branch, and a spur pruned to two eyes for the production of wood.

Short pruning consists in leaving several short spurs, with two or three eyes each, for the production of wood and fruit, the number of spurs depending on the age and vigour of the vine. But it may be asked: "Why should a vigneron bother about long pruning, with its fruit branch and wood spur, when it is so much easier to cut all the canes down to two eyes and have done with it?"

The reason is, because, in certain varieties of vines, the eyes of a cane nearest the stock are frequently sterile, so that, by short pruning, only the sterile part would be left to vegetate, whereas the buds further away from the stock contain the embryo of a more numerous and finer quality of bunches. It is necessary, therefore, before pruning, to be sure which method is the more suitable to your vines. The reasons for having two systems being now explained, the mode of procedure in long pruning will be taken first.

Long Pruning.

Until a vine is two years old, it should be pruned to one spur, with two or three eyes. In some Queensland soils, where the young vine shows great vigour and vegetation, three eyes should be left to carry off the sap; in the third year, the plant will be represented as in Fig. 1. To initiate long pruning,



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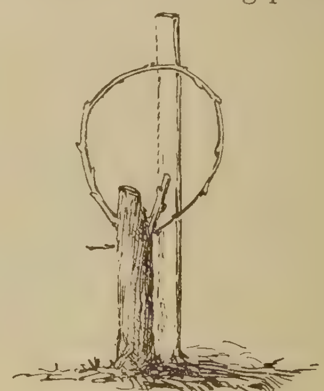

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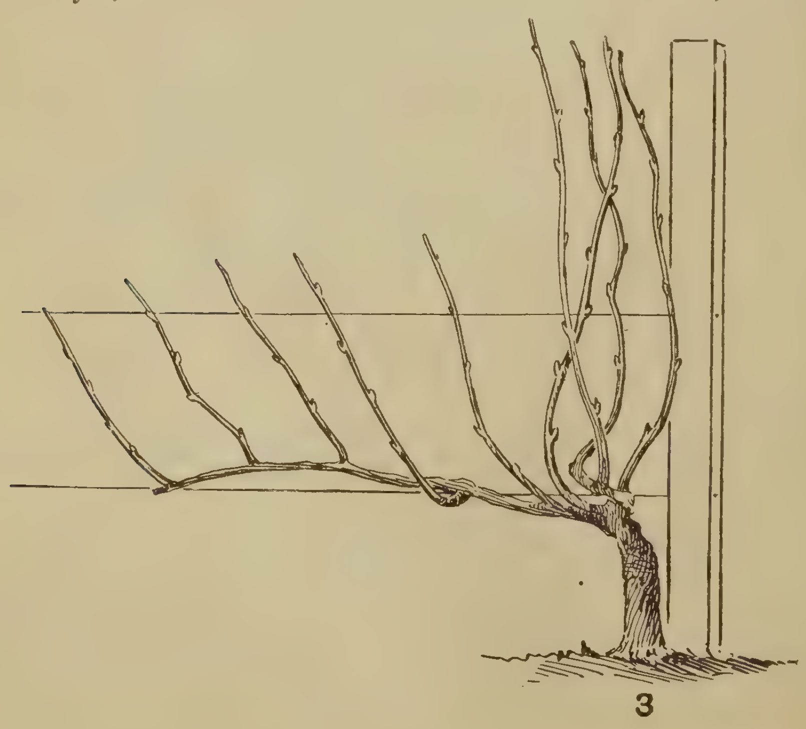
the upper cane should be removed, as shown by the dotted line *a*, and the lowest shortened to two eyes at *b*, to form the wood spur; the fruit branch *c* is left with six eyes, and arched down to the wire or to the stake, as in Fig. 2.



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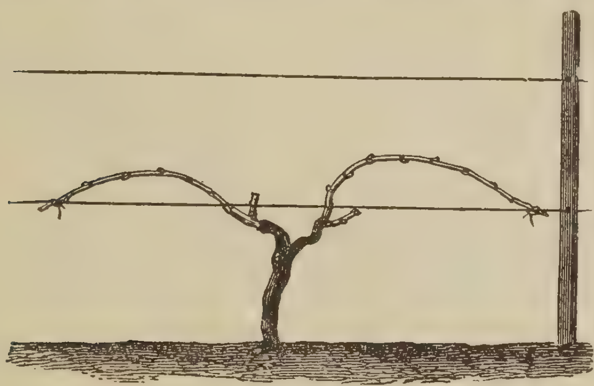
The following season the vine will present the appearance of Fig. 3; if it is trained on wire, the whole of the branch that bore fruit must be pruned away close to the stock, and two of the best canes from the wood spur chosen—one to be arched down for fruit-bearing as before, and the other pruned to two eyes for the next season's wood. Once the vine has been started on this system, the pruning is easily understood and quickly accomplished, but to bring vines which have been improperly pruned under this system will require judgment and loss of time.

In a year or two, if the soil is fertile, and the young vine shows vigour, the system may be doubled, as at Fig. 4. It is well to keep one or two adventitious shoots pruned to two eyes, as at Fig. 5, to be enabled to double the system at any time, or to replace canes damaged by wind or accidents.



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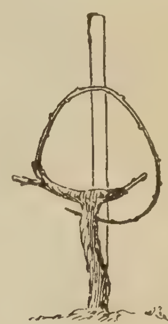

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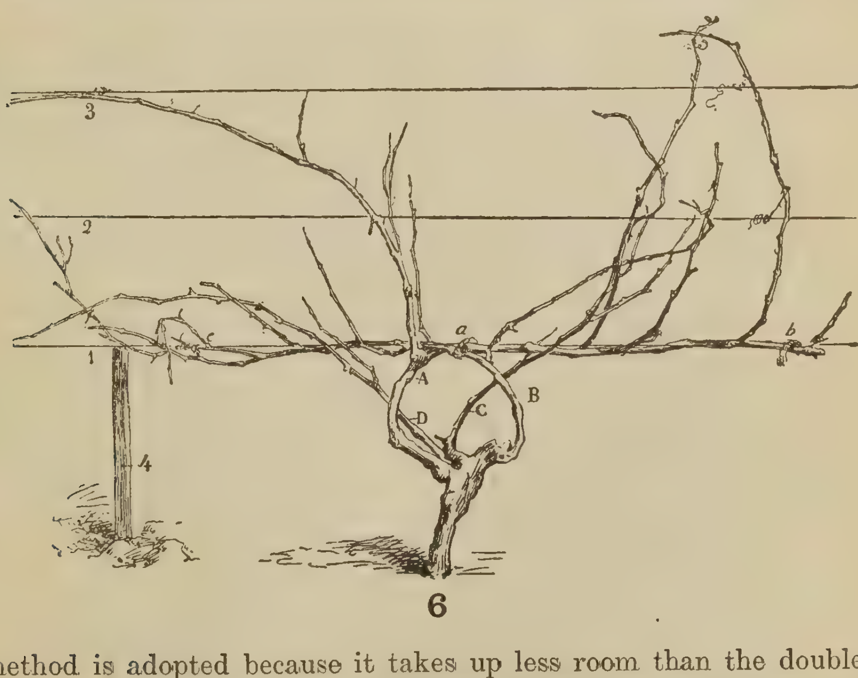
The method of pruning just described is called the double and single Guyot, or single and double rod-pruning.

The Quarante system is a double Guyot, with the fruit branches crossed, as at Fig. 6. In Europe, where vines are planted much closer than in Australia,



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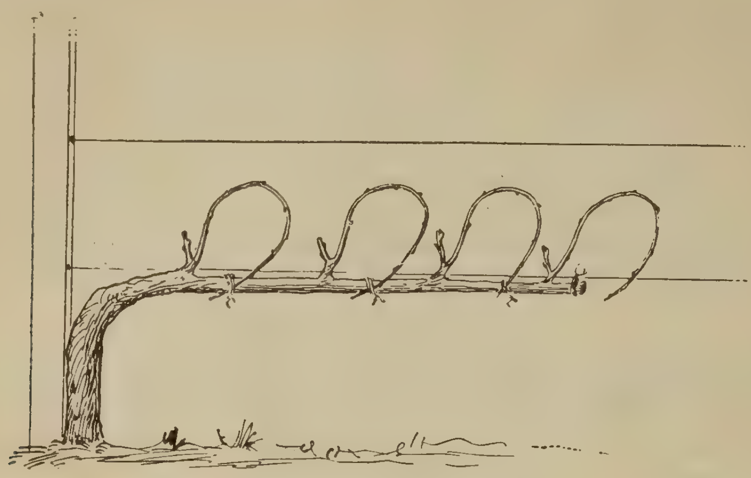
this method is adopted because it takes up less room than the double Guyot. When the soil is very rich and fertile, and the vine shows great vigour, the long-rod system may be still further developed, as in Fig. 7, where it is quadrupled and called the Cazenave, but some management would be necessary to provide the elongated stock on which the spurs are developed.

The vigneron will ask: "But how am I to know whether a vine is too much pruned or not pruned enough—whether it is vigorous enough to bear the double or quadruple Guyot systems?"



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The answer is: If the vine is pruned too much, the canes will be long, thick, and probably branched, bearing little fruit. If the vine is pruned too long, the shoots will be weak and stunted. It is a thermometer there is no mistaking. So long as the spurs for wood continue to produce canes sufficiently long for next year's fruit branch, the vigneron may continue to lengthen the pruning of the fruit branch; but when the canes begin to weaken and shorten he must shorten his fruit branch. He has only to keep his eye on the canes for next year's fruit branch to have an infallable guide to prune by. These canes should not be less than from $3\frac{1}{2}$ feet to 4 feet in length. Be careful in pruning to leave the fruit branch above the spur for wood, and not *vice versâ*, or the stock will increase in length too rapidly. It will be well also to pinch off the first two buds of the fruit branch when they invariably prove sterile, but not otherwise.

SHORT PRUNING.

As before mentioned, short pruning is adopted for certain varieties of vines that have all the buds on the canes equally fertile. Short pruning in this case causes no loss to the vigneron, and the vineyard can be cultivated without training the vine on wires. The vine, in its third year, as shown in Fig. 1, is pruned to two spurs, *b* being cut away as for long pruning, and *a* and *c* shortened to two eyes each. Next year, instead of two spurs, there may be left off two eyes each, always choosing a shoot to form the spur as near the stock as possible, as in Fig. 8.

The following season another spur can be developed, as in Fig. 9, choosing, as before, a cane for forming the spur as near the crown as possible.

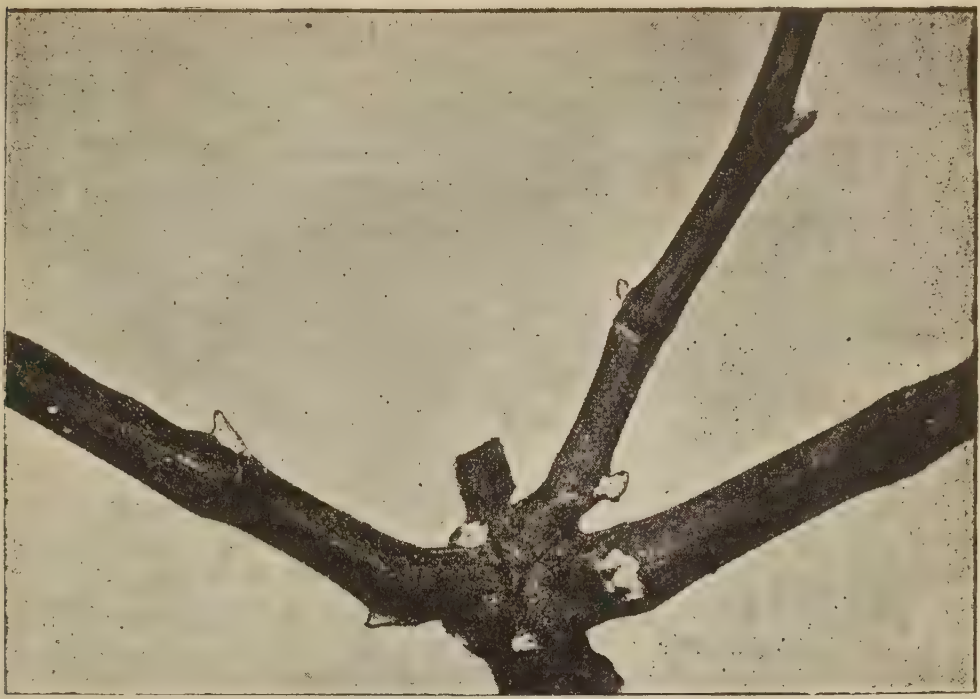
It may not be possible always to get new canes so propitiously placed as in Figs. 8 and 9, but they are reproduced from Professor Perkins' work to show the vigneron the shape he should give his young vine; and, if he cannot attain such symmetry, he must get it as nearly as possible. If no cane from the crown offers for forming a spur, choose a cane from an older spur, as at *a* in Fig. 10.

This system of short pruning is called the bush, goblet, or fan, according to the position given to the spurs.

A variation of short pruning, when wires are used, is the horizontal cordon, or Royat system, as in Fig. 11.

Here the spurs are distributed along the stock, bent at right angles along the wire, and should be equal in number to those in the goblet form. A double horizontal cordon has two arms, one on either side of the stock, with spurs at

intervals. In France the horizontal cordon system is denounced by some writers on the ground that the exaggeration of the stock entails a decrepitude of



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the vine, and affords more cover for noxious insects, but there is no doubt that with many it is an attractive form of pruning. This system should not be adopted where, from poverty of soil or dryness of climate, the vegetation of the

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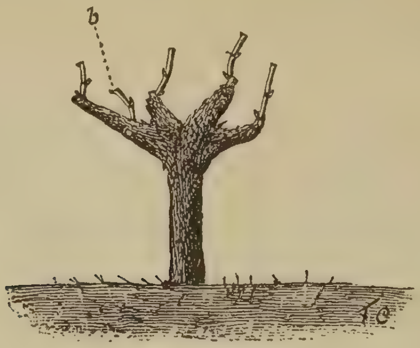
vine is feeble, and insufficient to impede work in the vineyard, if pruned goblet fashion. One of the great mistakes made by many of the Queensland vignerons is where a spur has been left with two or three eyes, each forming a cane in the



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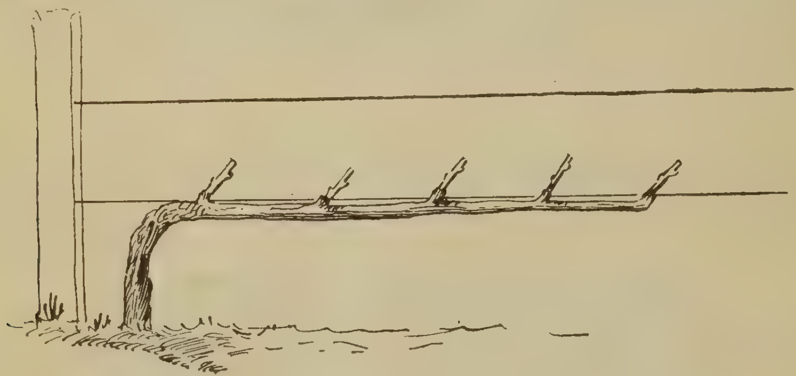
following season, instead of cutting back to one spur with three eyes they have pruned *each cane* to two or three eyes, so that every year the spurs are doubled in number. No vine in the world can bear such a system of pruning without having its vigour and bearing power seriously weakened.



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The mournful object depicted at Fig. 12 is a typical vine badly pruned. More than twenty-five spurs have been left to vegetate instead of six or eight, most of the shoots are from 18 inches to 2 feet long, and the base of the spurs has a mass of dead wood interfering with the circulation of the sap.

To bring this vine into proper shape and condition is an impossibility; but, with a view of giving inexperienced vignerons some idea of the treatment for similar cases to improve its condition, and give it a more rational shape, the same vine is shown pruned at Fig. 13.

A in Fig. 12 has been cut away altogether, as there was sacrcely any life in it, and B, the only strong shoot on the vine, laid down in its place; C has been cleaned of dead spurs, &c., and pruned to three spurs of three eyes each; D has been shortened, as the upper part was dead or dying, and pruned to four spurs of two and three eyes each; E has been shortened, as it straggled into the next vine, and pruned to one spur of three eyes; no other wood offering, the whole assumes the appearance of Fig. 13.

It must be understood that the vine can, under no circumstances, be reduced to a symmetrical shape, but it will be far healthier and more vigorous than before, and will stand a chance of living for years. A vineyard left in the condition as shown by Fig. 12 is doomed to an early death.

Plate IX.

Fig. 12.—Showing Improperly Pruned Vine.

Fig. 13.—Showing First Stage of Improvement.

Plate X.

Ficus Tryoni, *Bail.*

Botany.

CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

By F. MANSON BAILEY, F.L.S., Colonial Botanist.

Order STACKHOUSIEÆ.

STACKHOUSIA, Sm.

S. Tryoni, *Bail sp. nov.* Stems often numerous, slender from a hard, woody root-stock, 6 to 8 in. high, somewhat glaucous, and more or less striated. Leaves narrow-linear, about 1 in. long, somewhat fleshy when fresh. Racemes (those on specimen examined) not exceeding 1 in. in length; flowers lavender colour, rather crowded at first, slightly hoary. Bracts small ovate, acute, margins ciliate. Calyx about ½-line long, including the acute ciliate lobes. Corolla-tube slightly exceeding 1 line, lobes ovate, about 1 line long. Anthers about half exserted from the orifice of corolla-tube.

Hab.: South Percy Island. On high open land.—*Tryon and Young Expd., Dec.,* 1905.

Order MYRTACEÆ.

EUCALYPTUS, L'Hér.

E. insulana, *Bail. sp nov.* This is said by Mr. Tryon to form bushes about 3 or 4 ft. high Branchlets prominently angular. Leaves coriaceous, ovate, oblong and very obtuse to almost acuminate, and 2 to 2½ in. long by 1¼ in. broad, to on the same branchlet lanceolate and 3 to 3½ in. long; on some luxuriant specimens the leaves measured 5 in and from 5 to 12 lines broad, and often ending in filiform points; lateral parallel nerves rather numerous and regular, and more or less prominent, as well as the reticulation, intramarginal nerve usually near the edge; oil dots rather large; petioles usually short on the broad leaves, often ½ in. long on the narrow ones. Peduncles axillary, rather thick and angular, 2 to 6 lines long, each bearing 2 to 6 sessile flowers; at the end of some branchlets the peduncles are so close together as to give the appearance of being a panicle of umbels; calyx-tube somewhat striated, broadly hemispherical, about 3 lines diameter. Operculum nearly hemispherical or somewhat longer than broad. Stamens pale-yellowish, 2 to 3 lines long; anthers oblong with parallel cells. Fruit cup-shaped 3 lines diameter, but those examined not quite ripe Capsule 3 or 4 celled, exserted portion prominent reddish-brown with a prominent umbo or boss in the centre. This island shrub approaches the West Australian, *E. Oldfieldii*, F.v.M., so closely that it might be given as a variety of that species; thus the above name must be understood as provisional. Indeed, with this protean genus great care is required in making species.

Hab.: Middle Percy Island. On elevated exposed situations, among grass-trees.—*Tryon and Young Expd., Dec.,* 1905.

Order URTICACEÆ.

FICUS, Linn.

F. Tryoni, *Bail. sp. nov.* A small handsome tree, with very dense foliage. Branchlets slender, rugose-angular. Leaf-bud scales or tegmenta narrow, of thin texture ½ to 1 in. long, pubescent with short hairs. Leaves alternate, lanceolate, the largest on the specimens to hand 2½ in. long, 10 lines broad, base more or less cuneate, apex often somewhat abruptly acuminate, faintly 3-nerved at the base or penninerved throughout, the lateral nerves parallel, about 12 on each side of the midrib, joining and forming an intramarginal one not far from the edge, with slender intermediate nerves and reticulation or netted veins. Receptacles in pairs, axillary, very small, quite sessile, under 3 lines diameter, very numerous, extending to the ends of the branchlets; subtending bracts orbicular, rather thick and pubescent. The fruits too much decayed to allow of further examination.

Hab.: Middle Percy Island. On high elevated localities.—*Tryon and Young Expd., Dec.,* 1905.

Tropical Industries.

INDIAN AGAVE AND FOURCROYA FIBRES.

Six samples of these fibres were sent from Madras to the Imperial Institute, London, by the Agri-Horticultural Society, Teynampett, Madras. It was stated that the plants had been grown at Madras, Bangalore, and Chickmagular, in the Kadur district—that is, at sea-level, and at 3,000 and 4,000 feet above the sea-level respectively. The samples were submitted to chemical and mechanical tests, and were referred to commercial experts for valuation. A description of the fibres, and an account of the results of the investigations are given in the "Bulletin of the Imperial Institute." We omit the results of the chemical analysis, as we take the following extracts merely with the object of pointing out the difference in value between Indian sisal and Fourcroya, and that of these plants grown in Mexico, the Bahamas, and Queensland:—

Sample No. 1 (*Agave Vera Cruz*).—This sample was of a dirty white colour, and had not been well cleaned and prepared, but still retained some adherent green matter. The material was rather weak and irregular in strength, and varied in length from 3 to 4 feet. The analysis showed that the fibre suffered considerable loss when boiled with dilute alkali (hydrolysis). It is probable, however, that this loss is largely due to the extraction of the alkali of gummy matter which was not removed during the preparation of the material, since the greater part of the loss took place during the first five minutes' boiling, and the additional loss after an hour's boiling. The proportion of cellulose in the fibre was also somewhat low, but this, again, was no doubt due to the presence of the impurities already mentioned.

The commercial experts reported that the fibre was worth about £24 to £25 per ton, but that, if well prepared and thoroughly cleaned, it would probably be worth £26 to £28 per ton in the London market.

Loss by hydrolysis, 41·2 per cent.

Cellulose, 71·4 per cent.

Sample No. 2 (*Agave Vera Cruz*).—This sample from Madras had been badly prepared and incompletely cleaned, a good deal of green matter still remaining attached to it. The material was of a brownish colour, of rather poor strength, and had a length of staple varying from 3 feet 9 inches to 4 feet 6 inches. In chemical behaviour and composition it closely resembled No. 1 sample. The commercial experts reported that the fibre was worth from £22 to £22 10s. per ton in the London market.

Loss by hydrolysis, 41·1 per cent.

Cellulose, 72·5 per cent.

Sample No. 3 (Sisal Hemp).—This sample of sisal hemp from Madras consisted of pale straw-coloured, lustrous fibre, which had been well cleaned, and was of fairly good, but rather irregular, strength. The length of staple varied from 3 feet 9 inches to 4 feet 3 inches.

The commercial expert reported that the fibre was fairly well cleaned, of medium length, and fair colour, and worth from £29 to £30 per ton in the London market.

Loss by hydrolysis, 30·5 per cent.

Cellulose, 75·7 per cent.

Sample No. 4 (Sisal Hemp).—This sample of sisal hemp from Lol Bagh, Bangalore, resembled sample No. 3, but was somewhat cleaner, and rather coarser. The material was of good strength, and had a length of staple 4½ to 5 feet.

The chemical analysis showed this sample to be somewhat superior to the preceding one, especially in the richness in cellulose.

The commercial experts reported that the fibre was of good quality, length, and colour, and had been fairly well cleaned, but contained some hard, imperfectly prepared strands, and that it was worth £31 to £32 per ton in the London market.

Loss by hydrolysis, 27·4 per cent.

Cellulose, 77·6 per cent.

Sample No. 5 (*Agave Wightii*).—This sample of fibre consisted of lustrous, pale straw-coloured fibre, which had been fairly well cleaned, but still retained a small quantity of adherent green matter. The material was of rather poor strength, and had a staple of 2 to 2½ feet long. There can be no doubt that this product would be of good serviceable quality if more care were exercised in its preparation.

The commercial experts reported that the fibre was soft, of fair colour, and fairly clean, but contained some coarse ends, and hard, imperfectly prepared strands. The value of the material was estimated at £22 to £23 per ton in the London market. [The fibre being so short had doubtless a good deal to do with the low valuation, 2 feet 6 inches being the least length of fibre saleable for rope-making and other work.—Ed. "Q.A.J."]

Loss by hydrolysis, 36 per cent.

Cellulose, 75·2 per cent.

Sample No. 6—Mauritius Hemp (*Furcræa gigantea*).—This sample of Mauritius hemp from Lol Bagh, Bangalore, was of a pale greenish-brown colour, and had been very imperfectly prepared. The product was fairly strong, and from 3 feet 6 inches to 4 feet 3 inches in length. The commercial experts reported that the sample consisted of rather short and coarse fibre, which was of a poor, dull colour, had not been well cleaned, and was worth £23 to £24 per ton in the London market.

Loss by hydrolysis, 41 per cent.

Cellulose, 70·3 per cent.

Experiments were made with the object of ascertaining the comparative strength of these fibres. For this purpose the breaking strain of single fibres (or filaments) of the material was determined, a large number of tests being made with each sample of fibre. A great variation was found in the strength of the individual fibres of any particular sample, corresponding more or less with the variation in their diameter. On taking the average of results in each case, the comparative strength of the samples was found to be as follows, the greatest strength observed—viz., that of sample No. 4—being represented as 100:—

Sample.	Comparative Strength.
No. 4.—Sisal hemp	100
No. 3.—Sisal hemp	87·5
No. 6.—Mauritius hemp	81·0
No. 2.—*Agave Vera Cruz* fibre	62·7
No. 5.—*Agave Wightii* fibre	57·9
No. 1.—*Agave Vera Cruz* fibre	55·3

Conclusions.

The results of this investigation show that the fibres, although of fair marketable quality, could be considerably improved by the exercise of greater care in their preparation. The commercial experts stated that the comparative market value of the various fibres of this class is very uncertain, as most of them are imperfectly cleaned, and that, consequently, the value is influenced to an unusual extent by the condition of the fibre.

The above-mentioned experiments, the results, and the conclusions drawn from them, are of especial interest to Queensland sisal planters. It should be noticed that the true sisal (*Agave rigida, var. sisalana*), and the Mauritius hemp (*Fourcroya gigantea*), in spite of being badly cleaned, and of no great length, were valued respectively at from £29 to £30, from £31 to £32, and

£23 to £24 per ton. Note should also be made of the fact that the difference in price between thoroughly well cleaned and badly prepared fibre amounts in value to from £2 to £4 per ton. This points to the necessity of properly preparing the fibre for market. Another important matter affecting the price of the fibre is the length of the staple, which, as I have stated, should not be less than 2 feet 6 inches to be saleable, and the price increases with increased length. How should the fibre be prepared in order to obtain the highest price? When the Agave leaves are passing through the machine, a slight stream of water should play on them as they pass under the beater bars. On leaving the machine, the fibre will have a slightly green tinge, which passes away when the material is hung up in the sun for a couple of hours. It will then appear white and lustrous, but there will still be a certain quantity of gummy matter adhering to the fibres. This can easily be got rid of by washing the fibre for a few minutes after it leaves the machine. All imperfectly cleaned fibre, having still some of the green cuticle or flesh of the leaf attached to it, should be kept separate. If these points are attended to, there will be no difficulty in obtaining the highest market price for bright straight fibre from 3 feet 6 inches to 6 feet in length. The same remarks apply to the cleaning of Fourcroya leaves, which here attain a length of from 6 to 9 feet.

A MACHINE FOR PICKING COTTON.

Since the invention of the mower, reaper, and binder operated by animal power and steam engine, the idea of utilising mechanical means for harvesting the American cotton crop has been agitated. The revolution which was caused in agriculture by the modern methods of gathering the cereal crops indicated the saving in time and labour which could be effected in the Southern cotton fields if a machine were perfected which would harvest the ripe cotton more expeditiously than the negro farm hand. A number of devices have been invented to take the place of hand labour in gathering the cotton crop. With one exception, however, all of these have proved failures. The principal defect has been that the machines would harvest the immature as well as the mature cotton. Those familiar with this branch of agriculture know that a field must be covered several times after the bolls begin to open, as, unlike grain, the cotton does not ripen with any uniformity. During the last harvesting season, however, a machine was employed in several of the Southern States, which proved to be not only a decided improvement over the ordinary hand method, but, by its means, only the ripe cotton was picked, the other plants being untouched.

As the photographs show, this picker is notable for the simplicity of its construction. Power is obtained from an ordinary gasoline engine, such as is used in automobiles of the smaller types. In fact, the engine installed in connection with the picker utilised in the field trials was taken from an Oldsmobile, and developed but 8-h.p. In moving the picker over the ground, gearing is employed as in traction engines. Sprocket chains pass around sprocket wheels on the rear axle, thence upward and around the driving shaft. The engine, which is mounted on the rear of the truck frame, as indicated in the photographs, is employed not only to move the picker over the field, but to operate the mechanism by which the cotton is harvested and placed in the storage receptacles. There are four of the latter attached to the sides of the machine. They consist merely of cloth cylinders, which are open at the top, the bottom ends being held together by strings, so that when the cotton is to be removed, it is only necessary to loosen the end by pulling the string, when the contents of the receptacle will fall out.

The lint is conveyed to the receptacles by tubes which are attached to the series of picking devices. The lower portions of these tubes, which are made of thin sheet iron, terminate in steel conduits of the same diameter inside. Each conduit or pipe contains a fan, which serves two purposes. It

Plate XII.

Pickers in a Queensland Cotton Field.

"doffs" or cleans the cotton, blowing out any bits of leaves, casing, or other foreign matter which may have been caught up with the lint by the picker arm, and drives the lint through the tube into the receptacle, with which it is connected, by air pressure.

The picker arms are dirigible in design, and comprise eight in all, four attached to the forward section of the machine and four to the rear section; all, of course, being connected with the tubing leading to the cotton receivers, and working in connection with fans. The picker arms are fastened to the conduits by means of hinged joints, and, as the illustrations show, each consists of a case enclosing an endless belt, which revolves upon pulleys placed at either end. This belt is provided with a series of curved teeth. At its outer end, the upper part of the casing is cut away, so that the belt is exposed for several inches. When the cotton is to be removed from a boll, the operator directs the outer end of the picking arm in such a position that the teeth engage the lint. As fast as it is stripped from the boll it is carried by the endless conveyor to the blower casing, as it is called, "doffed," and forced through the tube into the receiving bag. The picking head, as it might be called, is provided with a shield intended to prevent hulls, leaves, and twigs from being drawn into the picker, but, as already stated, any small particles of foreign matter are removed by fans.

The means for actuating the picker belts and doffer fan consist of a light shaft running longitudinally of the machine, and parallel to the fore and aft extension tubings. This shaft is geared to the engine through the medium of gears and friction clutch, the lever of the clutch being arranged convenient to the driver. This shaft has a constant speed, and is independent of the motion of the machine through the field. Power is applied to the picker belt and doffer fan from this shaft through an arrangement of light sprocket wheels and chains, which permit the dirigibility of the picking arms without in the least interfering with their flexibillty.

There are seats provided on the machine to carry four operators, and each operator is provided with two picking arms, one for each hand. The arrangement of seats and picking arms is such that, when facing in the direction in which the machine is travelling over the field, the two rear operators face to the right, one picking one side of the centre row and the other picking one side of the left outside row. Thus, all of the row and one-half of each of the outside rows, in all, equal to two rows, are picked.

During the trials which were made in the cotton fields in North Carolina and Alabama, it was found that 8-h.p. was ample to give the machine necessary momentum with its force of hands, also to operate the picking and transferring mechanism. The rate of speed in the fields varies, of course, according to the amount of cotton to be picked. Where a large proportion of the bolls are open, the field is covered in less time than where a small quantity of cotton is ready to be gathered, but, it is obvious that with the device which can be guided as described, only the mature cotton need be gathered. As the picking belts revolve at the rate of about 350 feet per minute, and eight of the pickers are in continuous operation, the capacity of the machine is much greater than where expert negro labour is employed. During the tests in Alabama, the machine moved at the rate of 31 feet per minute, picking three rows of plants simultaneously. In a day of ten hours, it covered nearly 5 acres. The operators were young negro boys, constituting all of the manual labour with the exception of the engineer. In this trial, the machine harvested 3,000 lb. of cotton in a day at a total cost of 7·45 dollars (£1 11s. 0½d.), including fuel and wages. At the usual price paid for cotton-picking in Alabama, the expense for harvesting the same quantity would be 15 dollars (£3), while the machine covered a given area in one-sixth of the time which would have been required by six expert cotton-pickers. In harvesting cotton in North Carolina, the same results were obtained. While the general design of the cotton-picker allows three rows of plants to be

harvested at one time, it can be readily enlarged to take in four, or, possibly, five rows, and it is probable that with other improvements, its capacity can be greatly increased, just as the harvester and binder of the wheat field has been radically changed since it was first introduced on the farms of the West. The inventor of the cotton-picker, Mr. George A. Lowry, is now experimenting with several additional devices, which are intended to further increase its speed and efficiency.

Such is the account of the cotton-picker as given in the "Scientific American." It would have been well if the price of the machine were also given. Should it be a reasonable one, and should the machine do the work which it apparently has done satisfactorily, then we may hope to see large areas of our Northern lands placed under cotton. To pick 3,000 lb. of seed cotton in Queensland at ½d. per lb. would cost £6 5s. The machine picks it for £1 11s., or about half a farthing per lb.; but even if the cost of machine-picking were double this figure, Queensland growers would profit immensely by its use.

THE NAUDET DIFFUSION PROCESS IN TRINIDAD.

In our issue of February, 1905, we made mention of a new process of making sugar, called the Hinton-Naudet process, stating that this was said to be an improvement on the Naudet process, and that a large plant to treat 600 tons of cane per day was being made in Glasgow for Trinidad. From the "Agricultural News," Barbados, we now learn that this plant is in operation in Trinidad, Madeira, Porto Rico, and Cuba.

The Harvey Engineering Company, Limited, has addressed to the "Louisiana Planter" the following letter, dated 24th March, 1906, with reference to the working of the Naudet diffusion process for extracting sugar from the cane:—

As the makers of the above-named machinery, we think it may interest some of your readers to hear of the progress being made by this new process, which is now at work in the island of Madeira, also in the islands of Trinidad, Porto Rico, and Cuba, in the West Indies. We have just received a few figures regarding the installation we erected last year on Caroni sugar estate, Trinidad, which no doubt will prove interesting to your readers.

This new process was only started for the first time in Trinidad last crop, and is about four times larger than the plant at Madeira, so that this was the first time the process had been installed on a large scale, grinding about 600 tons of cane per day, and, naturally, being entirely new to the people, there were many difficulties and drawbacks in working the process to be overcome, which was to be expected, considering the great revolution this process accomplishes in the manufacture of cane sugar. Still, last year the entire crop was taken off by the Naudet process, and gave a much better result than the previous year, which was done by double-crushing mills. This year a number of important improvements have been made, so that the results are even still better. The owner of the estate writes to us as follows:—"The alterations and improvements which you have made on your Naudet machinery for this crop have been most satisfactory, and gave no trouble at all—in fact, the whole machinery works like clockwork. The average extraction for two weeks was 95 per cent., and last week for two days the extraction was 97·2 and 97·7 per cent. As to the fuel question, we have six boilers, and only burn coal under one of them; the other five boilers give ample steam, and the only fuel used is the exhausted megas from the Naudet battery."

From this it will be seen that this new process extracts at least 97 per cent. of the total sucrose in the cane, so that only 3 per cent. of the sucrose is lost, which is a much higher extraction than any 9-roller mill has ever yet been able to attain. The juice is also much purer, as the canes have only passed through one crushing.

As regards the fuel question: we calculate that the coal used under the one boiler will work at about $1\frac{1}{2}$ to 2 cwt. of coal per ton of sugar made, but this is a small matter when the extra sugar recovered is considered. Also, the manager of Caroni estate informs us that he is in hopes, before the end of the crop, of working the factory without any additional fuel beyond the megass from the Naudet process.

Owing to the juice being limed, superheated, and thus sterilised, within five or ten minutes after being expressed from the mill, and thereafter enclosed entirely from the atmosphere, there is practically little or no inversion whatsoever. The juice is so thoroughly clarified by the circulation through the megass in the Naudet battery, and so freed from all impurities and gummy matters, that, when evaporated, it becomes a syrup which works very freely in the vacuum pans. Therefore, not only is the extraction of the sucrose almost perfect, but the recovery of actual sugar from the juice is also high, so that about 8 tons of cane only are required to make 1 ton of sugar.

Another point is the simplicity and easily controlled operations of manufacture, as no clarifiers, subsiders, eliminators, or filter presses are used. The juice from the first mill is immediately limed and heated, passes through the Naudet macerating battery, and, when dark crystals for refining purposes are required, no sulphur is used, but the juice passes on direct from the Naudet battery into the triple effect, and so to the vacuum pans, crystallisers, and centrifugals, in the usual manner; when yellow sugar is required, the juice must be sulphured; when white sugar is desired, then additional sulphuring and Philippe or other bag filters must be used.

These results amply prove that this process is one which will have serious consideration in the future, and place the new process beyond being called experimental, as this estate in Trinidad is now taking off its second crop by the Naudet process in a most satisfactory manner.

THE SPENCE COTTON-TREE.

Mr. J. R. Spence, writing from Wellas Cotton Plantation, Deesa, claims to have discovered a variety of cotton-tree, indigenous to India, capable of revolutionising the cotton industry of India. He says: "I have had the good fortune to discover that there exists a tree, practically indigenous, at present growing in various parts of the Bombay and Madras Presidencies, which produces a cotton infinitely superior both in classification and staple to American cotton, and in classification alone cannot be equalled in Egypt. It is an astonishing fact that the value of this tree's product has not, up to this time, been discovered by anyone in the cotton trade, notwithstanding the fact that the tree has been known to exist since the time of the mutiny, and probably for hundreds of years previously. I first saw the tree in a friend's garden at Deesa. After carefully examining it, I unhesitatingly expressed the opinion that it possibly would ultimately revolutionise the cotton cultivation of India. I then sent samples to Bombay and Liverpool, where experts in the former city classed it as 'fine,' white in colour; staple, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long; and said it would spin up to 60s. In the latter city it was classed 'superfine,' colour white; staple, 1 3-6ths to $1\frac{1}{4}$ inches in length, and valued at 7·8d. per lb—above the price of 'middling' American. I then decided to undertake the cultivation of the tree on a large scale, bought up the available seed, and made arrangements to procure all grown in the neighbourhood in the future. There are now considerably over a lakh (100,000) of trees on this plantation, in a most flourishing condition, growing to a height of from 4 to $5\frac{1}{2}$ feet, full of buds and bolls, and bearing cotton daily after being planted only six months. The quality of the 'new crop,' 1906, cotton is superior both in classification and staple to that of the parent tree. The yield the first year has been estimated by experts at a minimum of 2 to 4 oz.

per tree, and, as there will be over 3,200 trees to the acre, this gives a total yield of 400 to 800 lb. per acre, which is above the average of Egypt, and no less than from eight to sixteen times greater than the average of all India. The second year's crop will probably be double the first, and the third year's double the second. Each succeeding crop will, no doubt, increase still further, as it is well known that trees of this variety, after the third year, have yielded 5 to 10 lb. of clean cotton per tree annually during a known life of twenty years and over. It will thus be seen that, if one-third of the cotton-growing area of India were planted with this tree, the result of the second year would be a crop far in excess of that of this country and America put together. The quality is so excellent that it opens an entirely new field for Indian manufacturers, the importance of which, bearing so greatly as it does upon the future prosperity of the country, cannot be over-estimated."—"Commercial Intelligence."

OF INTEREST TO COTTON-GROWERS.

Sir Daniel Morris, K.C.M.G., of the West India Agricultural Department, writes me (Sir Alfred Jones) that cotton-growing has been immensely successful this year, and about £150,000 worth has been sold. Next year, he says, it will double itself. These are gratifying facts. The cotton is grown in the West Indies at about 8d. to 10d. per lb., and fetches 1s. 4d. per lb. in Liverpool.

As regards West Africa, I have no doubt that, with transport facilities, we shall double our cotton exports every year. (Memo.: I think I read of the Lancashire Cotton Association wishing the present Government to guarantee, &c., a railway to where sufficient cotton can be grown to supply Lancashire, but the Government refused. Quoted the Uganda line as an example.) According to a Reuter telegram from Atlanta, Georgia, the Southern Cotton Association estimates the area under cotton in 1906 at 27,735,870 acres, being a net increase of 2·76 per cent. The estimate also predicts that a scarcity of labour will cause an abandonment of 10 per cent. of the acreage.—"Commercial Intelligence."

BRITISH COTTON-GROWING.

REMARKABLE GROWTH OF THE MOVEMENT.

In reply to a question in the House of Commons last week, the Under Secretary for the Colonies quoted the following statistics, showing the remarkable development of the British cotton-growing movement.

In 1902, the value of cotton exported from British colonies to the United Kingdom was £4,742, and in 1904, £52,026.

The amount exported to all other countries was of the value of £11,467 in 1902, and £61,475 in 1904.

The amount of cotton grown under the auspices of the British Cotton-growing Association in the several years mentioned was of the following value:—

	£
1903	29,000
1904	80,000
1905	190,000
1906 (estimated)	330,000

—"Commercial Intelligence."

Chemistry.

ELEMENTARY LESSONS ON THE CHEMISTRY OF THE FARM, DAIRY, AND HOUSEHOLD.

By J. C. BRÜNNICH, Agricultural Chemist.

Thirteenth Lesson.

The Plant.—Organic Compounds: Carbon Chains and Rings. Hydrocarbons (Petroleum): Alcohols. Carbohydrates: Cellulose, Starch, Dextrin, and Gums.

In one of our earlier lessons we have already learned that **plants** consist of **combustible organic matters** and **incombustible mineral matters**, the former being consumed, and disappear in the form of gases and smoke, when the plants are burned, and the latter only remain behind in the form of **ash**.

The **organic compounds** which exist in all the various parts of **plants** are found to be formed by the combination of a very few elements. The basis of all organic compounds is **carbon**, and for this reason the important and, to the agriculturist, most interesting branch of Chemistry dealing with organic compounds, is called **chemistry of carbon compounds**. The other elements which take part in the formation of these compounds are **hydrogen, oxygen, nitrogen,** and also small amounts of **sulphur** and **phosphorous.**

In accordance with their composition, carbon compounds may be divided into two large divisions—

1. **Nitrogen free organic compounds.**
2. **Nitrogenous organic compounds.**

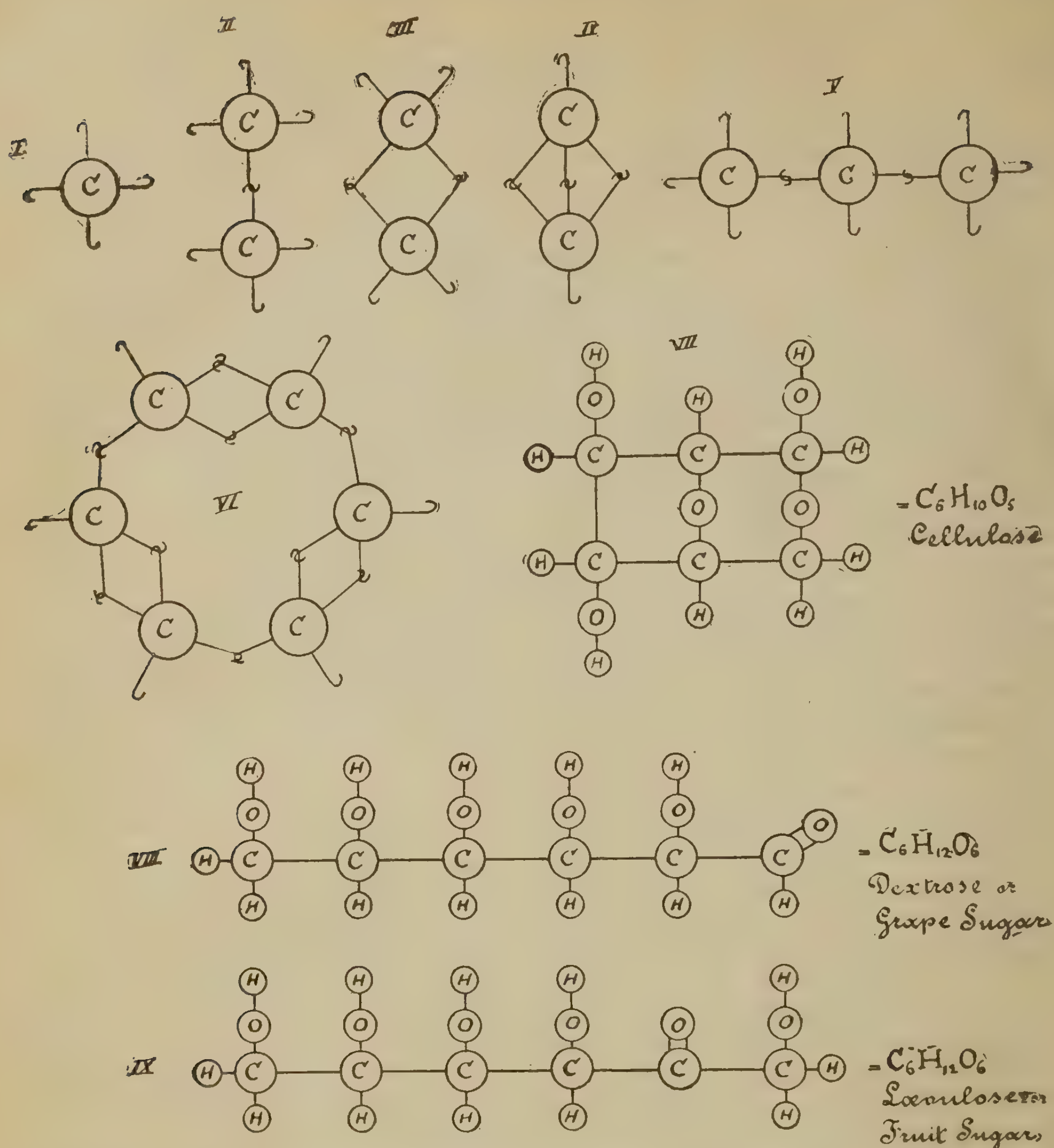
The first division of nitrogen free compounds may be subdivided into—

1. *Hydrocarbons*, containing Carbon and Hydrogen.
2. *Alcohols*, containing Carbon, Hydrogen, and Oxygen.
3. *Carbohydrates* (Sugars, &c.).
4. *Fats* and *Waxes*.
5. *Organic Acids*, and their salts.
6. *Glucosides*, *Resins*, and *colouring matters*.

We have also already learned that the organic compounds found in all plants are the products of **assimilation** or **carbon fixation**, depending entirely on the small amount of carbonic acid present in the air. Such a process of production or building up of very complex carbonic compounds from simpler compounds is also called **photosynthesis**, as it only takes place with the help of light in some of the plant cells.

The still more complicated processes which go on in the living cells, changing one compound into others, are **metabolic processes**, also called **metabolism**.

The enormous number and variety of carbon compounds, which are known to exist, and which are daily being added to by our research chemists, are explained by the peculiarity of the carbon atoms to form *chains* and *rings* with each other. In our fourth lesson we have been told that each carbon atom is *tetravalent*, which means that one atom of carbon may combine with four atoms of hydrogen, to form the normal and saturated compound Methane, CH_4, or marsh gas, or may combine with two bivalent oxygen atoms to form Carbon dioxide, CO_2, or carbonic acid gas. The valency of elements may be compared with a number of hooks, which every atom may be imagined to possess, and which may link up with hooks of atoms of the same or other elements. The hydrogen atom, being one of the monovalent elements, has only one hook, whereas the bivalent oxygen atom has two hooks, and may combine with two hydrogen atoms, forming H_2O; carbon, again, has four such hooks. Now, the carbon atoms themselves may link or hook together, joining only with one hook of one atom with a hook from another atom, or they may



unite with two or more hooks of another atom. Whenever atoms are joined with each other with two or three hooks the union is not a very stable one; the compounds are called **unsaturated compounds**, and by certain chemical reactions one or more of these bonds may be broken, and new substances are formed by adding new atoms, or group of atoms (*radicals*), on to the bonds or hooks which have been set free.

In our diagram Fig. I. represents a *single tetravalent carbon atom*, with four imaginary hooks of affinity; in Fig. II. we see two carbon atoms joined by one hook with each other, leaving thus six hooks of affinity open, having thus a *hexavalent double carbon atom.* In Fig. III. again we have a *tetravalent double carbon atom*, as the two carbon atoms are joined by two hooks with each other, and, finally, in Fig. IV. we have a *bivalent double carbon atom*, which, if the hooks are linked up with hydrogen atoms, forms the well-known compound Acetylene, C_2H_2. Long chains of such atoms may be formed in which the free hooks are attached to other elements, or to groups of atoms of elements. It is very easily understood that, in accordance with the position in which the elementary atoms, or groups of atoms, are placed with regard to the carbon atoms, different compounds may be formed, as it would be quite different if, for instance, an oxygen atom was linked on to one of the end carbon atoms, or to one of the middle ones. A very interesting illustration of

this difference is given by the constitutional formulas of the Carbohydrates, $C_6H_{12}O_6$, of which two distinct varieties exist—namely, *grape sugar* or *dextrose*, and *fruit sugar* or *lævulose*. We know that these two compounds show a considerable difference in their properties, still on analysis we would find that they both contain the same amounts of carbon, of hydrogen, and of oxygen, that 6 atoms of carbon are combined with 6 molecules of water, but the differences are explained by the constitutional formulas shown in Figs. VIII. and IX., in which we see that in the one case an oxygen atom is combined with an end carbon atom, and in the other with the second last carbon atom. I also give as an illustration the constitutional formula (Fig. VII.) of another carbohydrate of similar composition—namely, *Cellulose*, $C_6H_{10}O_5$, the woody substance of plants. Although such constitutional formulas give us some idea of the actual composition, and will explain certain properties, and will even allow us to make certain deductions with reference to certain properties, we must not for one moment imagine that they form a true picture of any chemical compound, because, as a matter of fact, a bodily group of atoms could not be represented by a formula in one plane only.

But not only chains of such carbon atoms must be imagined to exist, but we have also rings of carbon atoms. The simplest of such rings is the *benzene* or *benzol ring*, a hexavalent ring of six carbon atoms, each one united with another carbon atom with one hook, and with another atom with two hooks (Fig. VI.).

Hydrocarbons.—These compounds of carbon and hydrogen have already been alluded to in our fifth lesson, and we have seen that—

Methane, or marsh gas, CH_4, is the simplest of saturated hydrocarbons. A very large number of hydrocarbons exist, which, as the number of carbon atoms they contain increase, become less and less volatile; the higher members are solids, and are called **Paraffin.** Between the gas and the solid paraffin come the *liquid paraffins*, which are a mixture of various hydrocarbons, and form our **paraffin oils** and **petroleum.** Most of the compounds belong to the Methane series of hydrocarbons of the general formula C_nH_{2n+2}. Any petroleum containing some of the lower and more volatile members of this series becomes dangerous for use, as explosive gas mixtures may be formed at comparatively low temperatures. Such petroleum or **kerosene** is said to have a *low flash point* (Experiment 85). In the manufacture of the commercial kerosene from *rock oil* or *mineral oil*, the lower, more volatile hydrocarbons are distilled off; the portion boiling at 60° C. (140° Fahr.) consists chiefly of **Hexane,** C_6H_{14}, which is sold as **petroleum spirit** or *gasolene*. The next portion, boiling at 110° C. (230° Fahr.), is **Heptane,** C_7H_{16}, and is sold as **naphtha** or *benzoline*. Kerosene oil itself boils between 150° C. and 300° C., and is generally refined by being treated with sulphuric acid. **Lubricating oils** and **paraffin wax** are also hydrocarbons, obtained by the distillation of certain coals—cannel coal.

Alcohols may be considered to be derivatives of the hydrocarbons, by having one or more of the hydrogen atoms of the hydrocarbon replaced by the hydroxyl group or radical, $-\ O\ -\ H$. The alcohols are generally products of fermentation, and resemble *ordinary alcohol*, **Ethyl Alcohol, Spirits of Wine,**

$$C_2H_6O \text{ or } \begin{array}{c}H\\H\\H\end{array}\!\!>\!C - C\!<\!\!\begin{array}{l}H\\H\\OH.\end{array}$$

This alcohol is obtained by the direct fermentation of glucose or grape sugar by the action of **yeast** cells. This fermentation cannot take place in an absolutely pure sugar solution, as small amounts of albuminous or nitrogenous matters and mineral salts are necessary for the growth of the yeast cells. When alcohol has to be produced from *starchy materials*—potatoes, grains, &c.—the **starch** has to be changed first into sugars—*malt sugar*—with the help of an infusion of **malt,** by the action of the peculiar ferment **diastase** which is produced during the germination of barley. The starch may also,

be changed into sugar—*starch sugar* or *glucose*—by treating with very dilute mineral acids. Either maltose or glucose can now be fermented and changed into alcohol by the action of yeast, which breaks up the sugar molecules into alcohol and carbonic acid.

$$C_6H_{12}O_6 + \text{yeast cells} = 2C_2H_6O + 2CO_2.$$

Cane sugar, by the action of yeast cells, is also at first split up into glucose, according to the formula—

$$C_{12}H_{22}O_{11} + H_2O \text{ (yeast cells)} = 2C_6H_{12}O_6,$$

which then can produce alcohol by further action. Nearly all the glucose is changed into ordinary alcohol; only small amounts of *higher alcohols,* as **fusel oil, glycerine,** &c., are formed at the same time.

If a solution contains too much sugar (more than one-third of its weight) it cannot be fermented by yeast; and, again, if the alcohol produced in the solution by fermentation amounts to one-sixth of the weight, further fermentation will cease, as the growth of the yeast cells is stopped by this amount of alcohol. No naturally fermented liquor can thus contain more than 17 per cent. of alcohol. For a good fermentation a temperature of about 25° to 30° C., or 77° to 86° Fahr., is the most favourable; during the fermentation the temperature of the liquid itself rises. When the fermentation is finished, the alcohol is obtained from the *wash* by distilling it off. The residue, consisting of the husks, cellulose, albuminoids, is a valuable food for cattle. The *raw spirit* obtained with an ordinary still contains only about one-third of its weight of alcohol, but, by redistillation in improved modern distilling apparatus, a much purer alcohol—**rectified spirits**—is obtained.

Pure alcohol is a colourless liquid, with a characteristic odour and burning taste. It freezes only at a very low temperature at (—130° C.), and for this reason thermometers used for the measuring of very low temperatures are filled with coloured alcohol instead of mercury. Alcohol may be mixed with water in all proportions, and pure alcohol itself absorbs and attracts water; for this reason alcohol is used for the preservation of animal and vegetable specimens in museums. Alcohol burns with a colourless, smokeless flame (Experiment 86) to water and carbonic acid gas. Alcohol is a good solvent for ethereal oils and essences, resins, alkaloids, &c.

In dilute solutions alcohol is easily oxidised, first into—

Aldehyde $CH_3 - C\genfrac{}{}{0pt}{}{-H}{=O}$, and finally into—

Acetic acid $CH_3 - C\genfrac{}{}{0pt}{}{=O}{-OH}$

Methyl alcohol, *wood spirit*, or *wood naphtha* $C\begin{smallmatrix}-H\\-H\\-H\\-OH\end{smallmatrix}$ is obtained when wood is distilled; it resembles in its properties closely ordinary alcohol.

Higher alcohols, **fusel oil,** are always obtained in small amounts during fermentations; they have a powerful and offensive smell, and are poisonous liquids.

The alcohols so far mentioned contain only one hydroxyl group, and are therefore called *monohydric alcohols.* Another product of fermentation,

Glycerine, or *glycerol*, $C_3H_5(OH)_3$ or $\begin{matrix}C\genfrac{}{}{0pt}{}{=H_2}{-OH}\\ | \\ C\genfrac{}{}{0pt}{}{-H}{-OH}\\ | \\ C\genfrac{}{}{0pt}{}{=H_2}{-OH}\end{matrix}$ is a *trihydric alcohol,* as it contains three hydroxyl groups.

It is, *in a pure state,* a colourless syrupy liquid, of very sweet taste, which is obtained in large quantities as a by-product of soap and candle works. All oils and fats are compounds of fatty acids with glycerine. *Palm oil,* for

instance, is a *glyceryl palmitate*, which, on being decomposed by steam at high temperatures, is split up into glycerine and the free palmitic acid.

$$(C_{15}H_{31} . COO)_3 . C_3H_5 + {}_3H_2O = C_3H_5(OH)_3 + 3C_{15}H_{31} . COOH$$

Palm oil, or glyceril palmitate. Superheated steam. Palmitic acid.

When heated, glycerine may be made to burn like ordinary alcohol (Experiment 87), but when heated suddenly it decomposes, and gives off irritating pungent vapours of a new substance, called *acrolein*, which is always produced by mouldering tallow candles. Glycerine absorbs water from the air, and, therefore, never dries up. It is used in medicine, household, and many industries; also, for the manufacture of *nitro glycerine*.

Alcohols form numerous other compounds by being able to combine with other radicals; by substituting the hydrogen of its hydroxyl group by other alcohol radicals we obtain **Ethers.** The radicle of the ordinary alcohol is *Ethyl*, C_2H_5 —, and by substituting this for the H in the OH group of another alcohol molecule, we obtain $C_2H_5—O—C_2H_5$, *Ethyl ether*, or **sulphuric ether,** a very volatile and highly inflammable colourless liquid, which has a peculiar characteristic odour. As ether contains more carbon than alcohol, it burns with a luminous smoky flame (Experiment 88). Ether is used as a solvent of fats, resins, guncotton (collodion), rubber, iodine, &c., and is used largely in medicine as an anæsthetic.

Carbohydrates.—The members of this most important group form the largest portion of the organic dry matter of plants, and form a most important constituent of most foods. They are all indifferent neutral compounds, containing only the elements carbon, hydrogen, and oxygen, the latter in the same proportion as in water. The number of carbon atoms is generally six or multiples of six. They are non-volatile solids. In plant life they are easily changed from one into another. When plants decay, these bodies produce humus. When strongly heated they decompose under charring, giving off acid vapours.

Carbohydrates are divided into—

(A) **Amyloses,** or *Polysaccharides*, as starch, dextrin, inulin, gums, and cellulose.

(B) **Sugars,** subdivided again into—

1. **Glucoses,** or *monoses*, as grape sugar, fruit sugar, &c.
2. **Saccharoses,** or *bioses*, as cane sugar, milk sugar, malt sugar, &c.

Amyloses have the general formula $[C_6H_{10}O_5]_x$; they differ from sugars that they are not so soluble, and, as a rule, non-crystalline, and do not reduce Fehling's copper solution (*see* Experiment 76 of 9th Lesson). When treated with dilute acids they are generally changed into sugars of the glucose group.

The most important compound of this group is **Cellulose,** which forms the substance of all cell walls, and thus the framework of plants. During the growth of the cells with the cellulose, other organic and inorganic substances are also deposited at the same time, and these compounds may be removed from the plant tissues by boiling alternately with dilute acids, dilute alkalies, alcohol, and ether, leaving then a residue of fairly pure cellulose (*woody fibre*). Cotton wool is almost pure cellulose. Cellulose is only soluble in a solution of copper oxide in ammonia, and in a solution of zinc chloride (Experiment 89). By treating cotton wool with caustic soda solution, its properties are largely changed (*mercerised cotton*). **Guncotton** is a nitro-cellulose, an explosive compound, obtained by the action of a mixture of nitric and sulphuric acids on cotton. A solution of guncotton in ether is called *collodion*. A good quality filter paper (Swedish filter paper) is almost pure cellulose. When immersing filter paper for a short time into a cold mixture of strong sulphuric acid with one-half of its volume of water, and then washing with water, and finally with dilute ammonia, the structure of the paper appears completely changed, as the product—**parchment paper**—is waterproof, very much stronger, and translucent (Experiment 90).

As the cells of plants get older, the cellulose is gradually changed into much more complex bodies. **Ligno-cellulose,** or *lignose*, which form woody substances are only partially digested by herbivorous animals. Ruminants, as cattle and sheep, will digest a much larger proportion of cellulose than horses. From these changes it will be understood that the older any straw or fodder gets before it is cut for food, the less digestible it will become.

Starch, *Amylose* $[C_6H_{10}O_5]_x$, is next to cellulose the most widely distributed organic compound of plants, and is found in the form of small granules deposited within the plant cells. Starch must be considered as a reserve food. The largest amount of starch on a given area is produced by potatoes, in which plants the starch, which, as already explained in our third lesson, is produced in the green leaves, is changed into a soluble form, in which form it is transported with the cell sap down to the roots, and finally deposited again as starch in the tubers of the plant.

The starch grains of various plants differ both in shape and size, and are easily distinguished by the aid of a microscope. Potato starch and, again, the starch of Queensland arrowroot (*Canna edulis*) are very large granules; whereas wheat and particularly rice starches are composed of very small starch grains.

As already stated, *starch serves as a reserve food* to plants as a building material for new cells, but in order to be used as such it has again to be changed into soluble compounds. Such a change takes place during the germination of seeds under the action of the peculiar ferment *diastase*.

Starch is manufactured in a purely mechanical way from any starchy material, like potatoes, rice, arrowroots, corn, by soaking and grinding the grain, or grating the tubes or roots, and washing the starch grains out with water. From the milky fluid obtained, the starch deposits in the form of a white paste, which only requires drying to produce commercial starch.

Starch grains are made up of two distinct chemical compounds, of an outside layer or wall of *starch cellulose*, and an interior of *granulose*. The outer cell wall protects the starch grains, and prevents them of being soluble in water; when heated the grain swells, bursts this cell wall, the granulose escapes and forms with water a sticky solution of **starch paste.** With iodine solution starch forms a blue or violet coloured compound (Experiment 91). When gently heating starch to about 210° C. (Experiment 92), or, again, boiling with dilute acids **Dextrin,** *British gum*, is obtained; a substance easily soluble in water, giving no colour, or only a slight reddish colouration, with iodine solution. Diastase, the organic ferment active during germination, and *ptyalin*, the peculiar active substance of saliva, all change starch into dextrin and into sugar. The digestion of all starchy foods is based on this important change of starch into sugars, and, in order to *derive full benefit of such foods*, it must be *thoroughly masticated* to encourage the flow of saliva, to mix the saliva with the food, and allow sufficient time for the saliva to act on the starch grains.

When starch and dextrin are heated with strong nitric acid, an oxidation into oxalic acid takes place (Experiment 94).

Gums $[C_6H_{10}O_5]_n$, are also found in small quantities widely distributed in plants; they are either soluble in water, forming a viscid sticky solution, or they absorb water and swell up, producing a jelly-like substance. Boiled with acids they also yield sugars. These bodies seem to be substances of excretion, and are frequently found as exudation on the branches and stems of plants.

Closely allied are *pectin bodies*, produced in ripening fruit, and causing the gelatinising when such fruit is boiled. Other intermediate products between cellulose and gums are the **Pentosans** of the general formula $(C_5H_8O_4)_n$ as wood-gum found in the stem of cereals; a certain class of these bodies, also, called *Furfuroids*, are generally estimated in modern fodder analysis, as these bodies are fermentable, and also digestible.

APPENDIX TO THIRTEENTH LESSON.

NOTES.—*Metabolic processes*, which build up more complex compounds from simpler ones—like, for instance, carbohydrates from carbonic acid—are called *anabolism;* whereas processes of destruction—as, for instance, the process of combustion during respiration—are called *catabolism.*

Experiment 85.—To test kerosene for its flash point, boil some water in a large beaker or basin; when boiling, remove flame and immerse in the hot water a long beaker about half-full of kerosene; cover beaker with a piece of cardboard carrying a thermometer just reaching into the liquid; when the thermometer has reached a temperature of about 100 degrees Fahr., remove the cardboard and apply a burning match near the top of the beaker; if a flash appears, the kerosene is unsafe—no flash should appear until the oil is heated to about 140 or 150 degrees Fahr.

Experiment 86.—Burn some ordinary spirits of wine, and show if too much water is added it will not burn.

Experiment 87.—Show the properties of glycerine—that it will not burn until heated to about 150 degrees C., and when heated strongly in a test tube produces the pungent odour of acrolein.

Experiment 88.—Burn ether, and show its luminous flame; also explain the intense cold produced when a few drops are allowed to evaporate on the hand.

Experiment 89.—Prepare a solution of Schweitzer's reagent by adding an excess of ammonia to a solution of copper sulphate. Treat some cotton wool with the solution; the cotton will be dissolved, and will be again precipitated on addition of an acid.

Experiment 90.—Prepare a solution of strong sulphuric acid and water by pouring 2 volumes of strong commercial acid into 1 volume of water. When cool, immerse for a moment a piece of filter paper, and immediately wash with a large amount of water. Show the difference in properties. The solution of the acid may be kept in a well-corked bottle, and used over again.

Experiment 91.—Make a starch paste, dissolve a few drops in water, and add a few drops of a solution of iodine in alcohol.

Experiment 92.—Heat starch gently in a ladle over a flame; keep stirring to prevent burning, to obtain dextrin. Show its solubility in cold and hot water and its colouration with iodine solution.

Experiment 93.—Take a little starch paste; dilute with water and add a few drops of sulphuric acid; boil for some time, and take out a few drops from time to time and test with iodine solution. At first, you will get the blue colouration of soluble starch; later on a yellow or red colour of dextrin; and, finally, no colouration at all, when all the dextrin is changed into starch sugar or dextrose. Now test for this sugar by boiling with a little Fehling's solution.

Experiment 94.—Heat starch in a test tube with strong nitric acid; red fumes will be given off, and a solution containing oxalic acid will be produced. Test for oxalic acid by adding, after neutralisation with ammonia, a few drops of calcium chloride solution.

QUESTIONS TO THIRTEENTH LESSON.

1. What elements take part in the composition of the principal organic compounds?
2. How may organic compounds be divided and subdivided?
3. Explain the reason that such a large number of compounds may be produced from so few elements.
4. What are hydrocarbons?
5. What are alcohols, and how are they derived from hydrocarbons?
6. How are most alcohols obtained?
7. Describe the properties of ordinary alcohol or spirits of wine.
8. How may alcohol be produced from starchy materials and from solutions containing sugar?
9. What is necessary for a favourable fermentation?
10. How is it that strongest natural port wine contains never more that 17 per cent. of alcohol?
11. What is glycerine, and how is it produced?
12. What are carbohydrates, and in what classes may they be divided?
13. Which are the principal properties of cellulose?
14. What are the differences between cellulose and starch?
15. How is starch utilised as a food?
16. How do you explain the peculiar fact that the starch originally formed in the leaves of a plant is later on deposited in the roots or in the seeds of plants?
17. On what property depends the safety of ordinary kerosene for domestic use?
18. How could you detect the presence of starch in any material?
19. Why is hay made from young grass more easily digested than hay from over-ripe grass?
20. How is parchment paper prepared?

Animal Pathology.

DISEASES IN THE GENERATIVE ORGANS OF DAIRY COWS.

A. P. Childers sends us the following translation of a short article on the above subject, by A. Svensden, Copenhagen, in "Cattle-breeding and Cattle-rearing." It will no doubt, as he thinks, interest a number of our readers, seeing that dairying is assuming such a prominent position in Queensland. Our correspondent's attention was drawn to the subject by the fact that he had three out of six cows which showed the symptoms here described: "In the dairy cow there is often developed a disease in the ovaries which partly shows itself in an oft-repeated desire for the bull, even though he is admitted to her, and partly in the relaxing of the pelvis sinews, making the cow appear as if she were near calving. She is often restless, and imitates the roaring of the bull, hence the Danes call such a cow a "Brummer." Formerly it was thought that this disease was of a tuberculous nature, but of late years it has been proved that it is caused by the formation of cysts on the surface of the ovaries. An experienced veterinary can, by examination through the rectum, ascertain if such cysts are present, and also if the contents is of a watery or of a viscid and lumpy nature. Where the disease occurs shortly after calving, it is generally in the first-mentioned form, which, as a rule, can be cured by one treatment. But where the contents of the cyst is glutinous or tenacious, as is often the case when the ailment occurs later in the milking period, there is less hope of a cure, and several treatments are invariably required. The treatment consists in pressing the ovary until the cyst breaks, and the contents are expelled. The purpose of this treatment is solely to maintain the fecundity of the animal, and there is no occasion to practice it on any but cows that are of special value for breeding purposes. Inferior animals it is preferable to castrate."

BLACK-LEG OR QUARTER-ILL.

Mr. W. H. Dalrymple, M.R.C.V.S., Veterinarian on the Staff of the Louisiana State University and A. and M. College, has furnished the following valuable information concerning this disease, its cause, symptoms, and treatment, which will doubtless greatly interest owners of dairy and other stock in Queensland:—

From time to time the Veterinary Department receives requests for information regarding "Black-leg," a disease quite fatal to young cattle frequently in the best of condition, but which does not appear to be recognised by many, and it is for the purpose of supplying to our cattle-owners something like accurate data on the subject that the Station publishes this short bulletin at the present time. We are not prepared to say that this disease is of more frequent occurrence than heretofore in the State, but, on account of the greater tendency on the part of our people to raise and own animals of better breeding, and, in consequence, of greater value, losses occurring in their stock may be receiving more attention as to cause, with the result that the trouble is being more frequently recognised, rather than becoming more frequent.

The value of young "scrub" cattle is relatively so inconsiderable that when a few of them die on the farm little thought is taken of the probable cause of death, and, therefore, no investigation is made to endeavour to discover it. Black-leg may have been at the bottom of many of such fatalities in the past, unrecognised, and because of the proper sanitary measures not having been taken to destroy infection in the bodies of the victims, the disease may, no doubt, have become established in certain localities, laying the foundation for

the cases in the more valuable animals, and which, because of their greater value, has caused owners to seek more information regarding the fatal ailment. Fortunately, although the disease is a very fatal one among young cattle, it can be almost wholly prevented by vaccination. In fact, statistics recorded by the National Department of Agriculture at Washington go to show that out of 1,500,000 animals vaccinated, the loss reached only about one-half of 1 per cent.

Besides being known as black-leg, the disease has other names, such as black-quarter, quarter-ill, symptomatic anthrax, symptomatic charbon, &c. To avoid confusion, however, we will confine ourselves to the first name, black-leg. The use of the terms, symptomatic anthrax and symptomatic charbon, has led to a good deal of misunderstanding and error in our State, so far as this disease is concerned, because, having anthrax or charbon as a part of the name, many have been led to think that the disease was genuine anthrax or charbon. Some writers on veterinary medicine use the terms, symptomatic anthrax and charbon symptomatique (the French), because of its apparent resemblance to the external appearance of that disease, especially a swelling that is usually to be found in those parts of the body thickly clothed with muscular tissue. But since bacteriology has assumed the rank of a most important science, it has been found that the two diseases are separate and distinct, and produced by entirely different organisms or germs. So that, in reality, the one has nothing at all to do with the other; the only similarity of importance being, perhaps, that both are rapid and fatal in their effect. For the information of our German settlers we may mention that this disease is known in their language as "Rauschbrand."

Cause.

Black-leg is a rapidly fatal infectious disease of young cattle, and is caused by a spore-bearing organism, the *bacillus Chauvoei.* Spring and fall are said to be the most favourable seasons for the development of the ailment, and cattle between the ages of six and eighteen months are the most liable to become affected, although partial susceptibility seems to remain up to about four years.

The manner of infection is by indirect contact with the germ on infected soil, the organism gaining entrance to the body through abrasions of the skin, and, perhaps, in rare cases, through the mucous membrane of the mouth and other parts of the alimentary canal. The wounds or abrasions are generally quite minute in size, but sufficiently deep to penetrate through the skin into the tissues underneath. Punctured wounds, such as those received from barbed wire fences or from stubbles or briers in pasture, seem to be the most likely method of infection, and correspond somewhat closely to the only manner in which the disease may be produced artificially—viz., through injection of the virus hypodermatically.

Symptoms.

The disease is easy of recognition on account of the symptoms being quite characteristic. It is characterised, first, by the symptoms of a more or less intense fever, and by the appearance of a specific tumour, or swelling, upon the body, neck, or upper part of the limb above the knee and hock, causing stiffness or lameness. This swelling is almost constantly found in the thick flesh or muscles of the parts mentioned. It consists of a progressive inflammatory enlargement, of firm and uniform consistence, rapidly extending in area and depth, and later becoming insensitive, crepitant, and resonant, or, in other words, the swelling emits a crackling sound when the hand is passed over it. This crepitant sound is due to the collection of gas in the affected flesh, and which is produced by the germs of the disease. When the swelling is cut into, a frothy, dark-red fluid escapes, and the flesh of the swelling is dark in colour, with the appearance of being mortified.

With few exceptions, the disease terminates fatally, death usually occurring in from twelve to thirty-six hours after the first appearance of the symptoms.

TREATMENT.

With regard to treatment, it may be said that curative (?) agents are of little or no avail—prevention being the only satisfactory method of attacking the disease. This may be divided into the following—viz., hygienic, and preventive or protective.

Hygienic.

This aims at destroying or preventing the spread of infection in all places where cattle are kept, and the second, to endeavour to fortify the systems of susceptible animals against an invasion of the black-leg germs.

Similar to anthrax (charbon) in this respect, black-leg infection is largely spread from the dead animal through the medium of carnivorous animals and birds (dogs, buzzards, &c.), or omnivorous animals (hogs) attacking the carcasses and carrying the germs broadcast, or the victim may be skinned for its hide, or incisions made into the swellings to "doctor" the patient, and the infection scattered from the cuts made in the swelling. These and other processes naturally assist in disseminating the virus or poison. In a circular on this disease, issued by the United States Department of Agriculture, at Washington, D. C., the following paragraph is italicised in order to give it emphasis: "It is, therefore, of the utmost importance that cattle-owners in the infected districts be made to realise that an animal affected with black-leg may be the cause of large subsequent losses from the same disease, perhaps not immediately, but within a period of years to follow, and it cannot be recommended too urgently that they make every effort to reduce the danger by taking adequate measures to destroy, as completely as possible, this source of renewed infection."

The best method of disposal is to cremate or burn the dead animal, and in order to ensure complete destruction of it, it should be placed on a couple of logs, or over a trench, and plenty of dry wood heaped around it. A few quarts of coal oil should then be poured on, and fire set to it. It has been claimed that in some parts of the State it is not possible to obtain sufficient wood for the purpose of burning up the bodies of animals that have died from infectious diseases, such, for example, as in certain parts of South-west Louisiana. This section, however, has the advantage of having oil in abundance, and an inexpensive and convenient method is, first, to dig a trench of sufficient size, and placing in the bottom of it a quantity of old sacking to act the part of a "wick," then saturating the sacking by directing a pipe from a barrel filled with oil into the trench. By regulating the flow of oil, a continuous flame may be kept up until the carcass is completely consumed, and at a minimum of cost, where such a method can be conveniently undertaken.

It is important that the carcass be entirely destroyed. The place, also, where the body has lain should be subjected either to heat, or it should be sprinkled with some powerful disinfectant, such as crude carbolic acid, creolin, zenoleum, lime, or other agent.

Unfortunately, there has as yet been no sure method found of completely eradicating black-leg infection from a pasture.

Preventive or Prophylactic.

It is to the division of prevention which we term prophylactic, combined, necessarily, with the hygienic, that we have to look for the most gratifying results, which are to be found in preventive vaccination of susceptible animals, and for which we are indebted to the discovery of Arloing, Cornevin, and Thomas, that animals could be protected against black-leg by injecting them with more or less virulent material obtained from the tumours of animals that had died of the disease. The beneficial results of this treatment may be appreciated by the reference made in our preliminary remarks concerning the

record of the United States Department of Agriculture. And, further, it may be mentioned that during the fiscal year ending 30th June, 1904, the department distributed over 1,000,000 doses of black-leg vaccine, which were used and reported upon by over 10,000 persons with highly satisfactory results, the mortality reaching only 0·44 per cent.

Black-leg vaccine is now a commercial commodity, and may be obtained from, or through, any of our large wholesale druggists, directions accompanying the material.

In conclusion, it may be stated that, although sheep and goats, as well as cattle, are susceptible to black-leg, they are rarely attacked by it, the disease being most common and destructive in the young bovine species.

Times of Sunrise and Sunset, 1906.

Date.	May.		June.		July.		August.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·14	5·16	6·32	5·0	6·40	5·4	6·30	5·18
2	6·14	5·15	6·32	5·0	6·40	5·4	6·29	5·18
3	6·15	5·14	6·32	5·0	6·40	5·4	6·29	5·19
4	6·15	5·13	6·32	5·0	6·40	5·5	6·28	5·19
5	6·16	5·13	6·33	5·0	6·40	5·5	6·28	5·20
6	6·17	5·12	6·33	5·0	6·40	5·5	6·27	5·20
7	6·17	5·12	6·34	5·0	6·40	5·6	6·27	5·21
8	6·18	5·11	6·34	5·0	6·39	5·6	6·26	5·22
9	6·18	5·11	6·35	4·59	0·39	5·6	6·25	5·23
10	6·19	5·10	6·35	4·59	6·39	5·7	6·24	5·24
11	6·19	5·10	6·35	4·59	6·39	5·7	6·23	5·24
12	6·20	5·9	6·35	4·59	6·39	5·7	6·22	5·25
13	6·20	5·8	6·36	5·0	6·39	5·8	6·21	5·25
14	6·21	5·8	6·36	5·0	6·39	5·8	6·20	5·26
15	6·21	5·7	6·36	5·0	6·38	5·9	6·19	5·26
16	6·22	5·7	6·36	5·0	6·38	5·9	6·18	5·26
17	6·23	5·6	6·36	5·0	6·38	5·10	6·17	5·27
18	6·23	5·6	6·36	5·1	6·37	5·10	6·16	5·27
19	6·24	5·5	6·36	5·1	6·37	5·11	6·15	5·28
20	6·25	5·5	6·37	5·1	6·36	5·11	6·14	5·28
21	6·25	5·4	6·37	5·1	6·36	5·12	6·13	5·29
22	6·26	5·4	6·37	5·1	6·35	5·12	6·12	5·29
23	6·26	5·3	6·37	5·2	6·35	5·13	6·11	5·30
24	6·27	5·3	6·38	5·2	6·34	5·14	6·10	5·30
25	6·27	5·2	6·38	5·2	6·34	5·14	6·9	5·31
26	6·28	5·2	6·38	5·2	6·33	5·15	6·8	5·31
27	6·28	5·1	6·38	5·2	6·33	5·15	6·7	5·32
28	6·29	5·1	6·39	5·2	6·32	5·16	6·6	5·32
29	6·30	5·0	6·39	5·3	6·32	5·16	6·5	5·32
30	6·31	5·0	6·39	5·3	6·31	5·17	6·4	5·33
31	6·31	5·0	...	...	6·31	5·17	6·4	5·33

Phases of the Moon.

			H.	M.	
1 May	☾	First Quarter	5	6	p.m.
8 „	○	Full Moon	12	9	„
15 „	☽	Last Quarter	5	2	a.m.
23 „	●	New Moon	6	0	„
31 „	☾	First Quarter	4	23	„
6 June	○	Full Moon	7	11	p.m.
13 „	☽	Last Quarter	5	34	„
21 „	●	New Moon	9	5	„
29 „	☾	First Quarter	12	18	„
6 July	○	Full Moon	2	27	a.m.
13 „	☽	Last Quarter	8	12	„
21 „	●	New Moon	10	59	„
28 „	☾	First Quarter	5	56	p.m.
4 Aug.	○	Full Moon	10	59	a.m.
12 „	☽	Last Quarter	0	47	„
19 „	●	New Moon	11	27	p.m
26 „	☾	First Quarter	10	42	„

The approximate times for sunrise and sunset at Rockhampton, Townsville, and Cooktown may be obtained by *using the table for Brisbane, and adding* the following figures:—

1906.	Rockhampton.		Townsville.		Cooktown.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.
May	2 m.	18 m.	13 m.	41 m.	12 m.	50 m.
June	1 m.	19 m.	10 m.	44 m.	7 m.	55 m.
July	2 m.	18 m.	10 m.	44 m.	9 m.	53 m.
August	5 m.	15 m.	18 m.	36 m.	16 m.	46 m.

By an oversight, the tables of the phases of the Moon, Sunset and Sunrise, were incorrectly given in the issues of the Journal for March and May.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE TOTAL RAINFALL FOR EACH MONTH OF THE YEAR IN THE AGRICULTURAL DISTRICTS OF QUEENSLAND.

Stations.	1905.							1906.					
	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.	May.	June.
North.													
Bowen	0·53	0·39	0·06	4·03	0·05	3·91	0·04	12·84	8·73	6·29	0·78	6·34	0·69
Cairns	1·94	0·43	2·27	Nil	0·46	1·72	0·53	7·00	16·87	16·05	5·20	4·04	3·44
Geraldton	9·39	2·41	3·88	Nil	0·22	5·44	1·14	15·61	37·67	19·67	11·51	7·93	16·05
Herberton	1·17	0·05	0·89	Nil	0·21	1·69	0·51	15·20	3·73	4·67	1·25	1·38	1·04
Hughenden	0·41	0·47	Nil	Nil	0·13	0·07	0·14	6·11	3·93	8·47	0·12	Nil	Nil
Kamerunga	2·59	1·11	2·16	Nil	0·63	1·05	0·33	7·25	13·76	14·93	4·94	4·13	3·55
Longreach	Nil	0·22	Nil	Nil	0·06	0·77	0·17	3·99	8·61	12·25	Nil	0·22	Nil
Lucinda	1·92	4·14	0·89	0·15	0·68	2·03	0·95	10·13	49·97	25·88	10·12	3·77	2·60
Mackay	1·82	0·95	0·66	0·97	0·08	2·45	0·70	13·58	9·88	16·57	2·87	11·87	3·85
Rockhampton	0·54	0·26	0·51	0·70	0·91	1·05	4·77	4·24	15·31	8·26	Nil	5·27	1·12
Townsville	0·35	0·68	0·06	...	0·52	0·19	Nil	10·05	17·31	4·28	0·38	1·80	0·30
South.													
Barcaldine	Nil	0·30	0·04	Nil	0·15	1·49	1·30	4·00	7·07	13·84	Nil	1·70	0·19
Beenleigh	0·40	0·27	1·12	1·15	2·82	1·76	3·77	4·96	15·11	9·34	0·04	3·57	1·47
Biggenden	0·60	0·28	0·10	0·79	2·56	1·14	11·66	2·27	8·24	4·61	0·45	5·77	1·42
Blackall	Nil	0·68	0·04	Nil	0·29	1·45	0·83	5·13	11·14	11·99	Nil	1·75	0·22
Brisbane	0·39	0·28	0·65	1·32	2·22	3·63	8·21	4·16	12·71	4·85	0·45	3·23	1·38
Bundaberg	1·10	0·71	0·17	0·95	2·37	0·95	6·74	6·92	9·92	1·90	1·17	8·44	2·01
Caboolture	0·26	0·05	0·36	0·98	2·73	2·88	6·72	8·11	12·73	6·46	0·49	4·53	0·83
Charleville	0·01	0·15	0·14	0·09	0·99	0·68	0·12	1·29	10·66	3·15	0·07	...	0·13
Dalby	0·25	1·15	0·76	0·14	2·09	1·60	5·67	4·15	4·43	5·15	1·81	0·66	0·87
Emerald	0·06	0·50	0·30	0·29	0·64	4·41	0·80	6·12	7·81	5·22	0·08	2·12	0·17
Esk	0·33	0·52	0·57	0·65	3·21	3·65	5·98	5·49	6·79	9·04	1·74	3·25	0·77
Gatton College ...	0·26	0·98	0·27	0·54	2·59	3·59	4·73	3·75	5·33	9·43	1·40	1·90	0·60
Gayndah	0·42	0·54	0·25	0·30	2·38	1·93	5·58	2·81	9·65	5·86	0·51	5·10	0·48
Gindie	0·11	0·37	0·09	Nil	1·11	3·79	Nil	1·92	9·15	5·92	Nil	2·32	0·05
Goondiwindi	0·55	0·52	0·58	Nil	3·57	1·51	2·72	1·08	2·60	2·19	0·37	2·80	0·98
Gympie	0·79	0·78	0·70	1·85	1·48	1·44	5·03	6·07	7·38	5·58	0·45	6·88	2·26
Ipswich	0·50	0·44	0·78	0·70	2·91	3·32	3·64	5·30	7·22	3·87	0·12	1·67	0·25
Laidley	0·56	0·56	0·61	0·30	2·36	3·59	3·73	3·29	5·63	6·73	0·35	2·83	0·54
Maryborough	1·21	0·07	0·26	1·04	2·48	0·70	4·03	4·46	8·34	6·77	1·08	4·85	2·55
Nambour	1·36	0·05	0·83	1·62	4·70	0·85	5·37	7·01	16·50	9·35	1·13	6·20	3·68
Nerang	0·61	0·27	1·55	1·04	4·59	2·21	5·14	5·01	13·68	10·04	0·87	10·32	1·98
Roma	0·21	0·35	0·31	0·15	1·02	2·15	2·62	2·18	12·95	3·94	Nil	1·09	1·08
Stanthorpe	1·01	0·63	1·77	0·28	3·48	1·94	4·43	6·06	2·76	3·18	2·00	0·77	0·45
Tambo	0·06	0·36	0·46	Nil	0·85	1·57	0·39	5·09	9·05	10·63	Nil	0·66	0·05
Taroom	0·33	0·67	0·31	Nil	0·76	1·11	2·52	1·86	13·73	6·02	0·23	1·04	0·81
Tewantin	2·06	0·22	0·55	1·29	6·57	1·28	6·64	12·07	18·59	7·57	2·27	4·61	5·68
Texas	0·80	0·53	1·09	0·16	3·54	0·94	4·54	3·41	2·11	1·94	1·89	1·57	0·75
Toowoomba	0·65	1·01	0·66	0·61	2·59	2·09	3·20	6·17	6·58	8·87	2·07	2·65	0·85
Warwick	0·77	0·26	1·01	0·41	4·00	2·16	3·98	2·09	2·21	6·27	0·37	0·77	0·57
Westbrook	0·46	0·71	0·61	1·23	2·60	3·62	2·39	5·00	4·01	5·12	0·93	0·50	*

* Returns not received.

GEORGE G. BOND,
For the Hydraulic Engineer.

PRICES IN BRITISH MARKETS OF ARTICLES WHICH CAN BE PRODUCED IN QUEENSLAND.

BUTTER.—Australian: Unsalted, 100s. to 108s.; exceptionally, 110s.; Dalgety and Co. quote 76s. to 98s. for other sorts. New Zealand, 76s. to 101s.; Danish, 104s. to 106s.; Siberian, 84s. to 96s.; Argentine, 92s. to 98s.

CHEESE.—Canadian, 40s. to 66s.; New Zealand, 59s. to 65s.; Queensland (Glenmore), 60s. per cwt.

SUGAR (duties, raw, 2s. to 4s. 9d. per cwt.; refined, 4s. 2d. and ¼ per ent.).—Refined, £17 to £18 10s.; raw, £14 to £18 10s. per ton; German eet, 8s. 10d. per cwt.

Molasses (duty, paid or allowed, 1s. to 2s. per cwt.; for agricultural purposes only, duty free).—5s. to 9s. per cwt.

Rice.—Real Carolina, £22 to £28; Rangoon, £8 5s. to £12; Japan, £13 to £17 10s.; Java, £16 to £20; Patna, £15 to £17 per ton.

Coffee (in bond, duty 1½d. per lb.).—Ceylon plantation, 52s. to 120s.; peaberry, 50s. to 108s.; Santos, 38s. to 50s.; Jamaica, 100s. to 125s. per cwt.

Chicory Root, Dried (duty paid, duty 13s. 3d.)—24s. to 25s. per cwt.

Arrowroot.—St. Vincent, 2d.; Natal, 5d.; Bermuda, 1s. 5d. per lb.

Maize, 23s. to 24s. per 480 lb.=2s. 10½d. to 3s. per bushel.

Wheat.—Duluth, 31s. to 33s. per 496 lb.; English, 31s. to 33s. per 504 lb.; Australian, 33s. to 34s. per 496 lb.

Malting Barley.—33s. to 37s. per 448 lb.; grinding, 24s. to 26s. per 416 lb.

Oats.—New Zealand, 22s. to 24s. per 384 lb.

Split Peas.—43s. to 50s. per 504 lb.

Ginger.—Jamaica, 60s. to 65s.; Cochin, 26s. to 27s.; Japan, 26s. to 27s. per cwt.

Vanilla.—7s. 9d. to 9s. 6d., 7 to 7½ in.; 3½ to 6½ in., 3s. to 6s. 3d. per lb.

Pepper.—Capsicums, bright red, 50s. to 57s.; mixed yellow, 50s.; chillies, bright red, 28s. to 30s.; mixed yellow, 30s. 6d. per cwt.; black, 5d. to 5⅛d.; white, 6¾d. to 7⅛d. per lb.

Rubber.—3s. 10d. to 5s. 4d.; Ceylon "biscuits," 6s. 6d. per lb.

Green Fruit.—Apples: Australian, 9s. 3d. to 12s.; Tasmanian, 11s. to 16s.; Tasmanian French crabs, 10s. to 10s. 6d.; Australian pears, 10s. to 22s. per case; bananas, 6s. 6d. to 12s. per bunch; pineapples, 3s. to 5s. each. Oranges, Valencia, per 420, common, 9s. to 11s. 6d.; medium, 12s. to 13s. 6d.; fine selected, 17s. to 20s.; choicest, 24s. to 34s. Lemons, Messina, per 360, ordinary to fine, 10s. to 11s.; finest selected, 16s. to 20s. per case.

Dates.—Tafilat, 30s. to 40s.; Egyptian, 18s. to 20s. per cwt.; Persian, 12s. to 16s. 6d. per case.

Cotton.—Uplands, Australian (Queensland), 6¼d. to 6½d.; Sea Island, 12d. to 15d.; Barbados, 18d.; St. Vincent, 19d. per lb.

Cotton Seed.—£7 1s. to £7 2s. 6d. per ton.

Cotton-seed Oil.—Crude, £20 10s.; refined, £22 10s. per ton.

Cotton-seed Oil Cake.—£4 15s. to £5 per ton.

Cotton Waste.—In 5 cwt. bag bales, 24s. to 34s.; discoloured, 18s. to 25s. per cwt.

Linseed.—41s. per qr.

Linseed Oil.—£21 10s. to £22 per ton.

Linseed Oil Cake.—£8 to £8 2s. 6d. per ton.

Olive Oil.—£35 10s. to £39 per tun (252 gallons).

Copra.—£18 10s. to £19 15s. to £20 per ton.

Cocoanut Oil.—£30 to £36 per ton.

Beeswax.—Australian, £7 to £7 10s. per cwt.; Peruvian, £7 10s.

Lucerne Seed.—58s. to 64s. per cwt.

Canary Seed.—54s. to 90s. per quarter of 480 lb. = 5s. 10½d. to 6s. per bushel.

Honey.—16s. to 25s. per cwt.

Manila Hemp.—£40 to £43 to £50 15s. per ton.

SISAL HEMP.—Indian, £27 per ton; Mexican withdrawn from sale in view of higher prices; nominal, £35. Sales of Queensland sisal were made in Melbourne during February and May, at £35 and £37 10s. per ton f.o.b. Brisbane. In our July issue Indian sisal was erroneously quoted at £34 to £36 10s., instead of £24 and £26 10s. Manila and sisal advanced last month by 20s. per ton, owing, firstly, to a good demand by the trade, and, secondly, to a fire in America which destroyed 10,000 bales of Manila and between 5,000 and 6,000 bales of sisal, a total loss of about £150,000 worth of fibre.

NEW ZEALAND HEMP.—£31 10s. per ton.

FOURCROYA (Mauritius Hemp).—£34 15s. 9d. per ton.

SANSEVIERIA (Murva or Bowstring) HEMP.—Bright, £40; dark, £35 per ton.

RAMIE.—£36 to £42 per ton. (Quotations for hemp are for best samples).

ESPARTO GRASS.—£3 5s. to £5 5s. per ton.

JUTE.—£24 10s. to £28 10s. per ton. During the early part of last month a strong tone prevailed in the London market in sympathy with the advances in Calcutta, as prices improved 50s. to 60s. Latterly, the market has weakened, and prices show a decline of 10s. to 15s. for new crop from the highest point.

DIVI DIVI.—£8 to £11 per ton.

TAPIOCA (duty, 5d. per cwt.).—2¼d. to 2¾d. per lb.; pearl, 21s. to 25s. per cwt.

EGGS.—French, 9s. to 9s. 6d.; Danish, 6s. 9d. to 8s. per 120.

BACON.—Irish, 62s. to 67s.; American, 52s. to 56s.; Canadian, 59s. to 64s. per cwt.

HAMS.—Irish, 84s. to 108s.; American, 54s. to 60s. per cwt.

PORK (frozen).—5½d. per lb.

TALLOW.—Mutton, fine, 31s. 9d.; medium, 28s. 9d.; beef, fine, 30s.; medium, 28s. 6d. per cwt.

POULTRY (Smithfield).—Surrey fowls, 3s. 9d. to 5s.; Lincolnshire fowls, 2s. 3d. to 3s. 6d.; Essex fowls, 2s. 9d. to 3s. 9d.; Irish fowls, 1s. 9d. to 2s. 3d.; feathered pigeons, 9d.; geese, 5s. to 6s.; ducks, 3s. to 4s.; turkey cocks, hens, English hares, no quotations; Australian rabbits, 13s. per crate; 5s. 6d. to 7s. 6d. per dozen; wild rabbits, 6d. each.

FROZEN MEAT.—The following are the Frozen Meat Trade Association's Smithfield market quotations for the undermentioned classes of frozen meat, based on actual sales of not less than 100 carcasses of mutton or lamb, or twenty-five quarters of beef, of fair average quality. These quotations are not for selected lines, but for parcels fairly representative of the bulk of the shipments now on the market:—

New Zealand Sheep.

(Crossbred Wethers and Merino Ewes.)

	July 14.	July 21.
Canterbury, light (48 lb. to 56 lb.)	3¾d.	3¾d.
Canterbury, medium (56 lb. to 64 lb.)	3$\frac{11}{16}$d.	3$\frac{11}{16}$d.
Canterbury, heavy (64 lb. to 72 lb.)	3⅝d.	3⅝d.
Southland (56 lb. to 64 lb.) ...	None offering.	
North Island (56 lb. to 65 lb.), ordinary	3¼d.	3¼d.
North Island, best brands (56 lb. to 65 lb.)	3⅜d.	3⅜d.

Australian Sheep.

(Crossbred and Merino Wethers.)

Heavy (over 50 lb.)	$3\frac{1}{8}$d.	$3\frac{1}{8}$d.
Light (under 50 lb.)	$3\frac{1}{4}$d.	$3\frac{1}{4}$d.

River Plate Sheep.

(Crossbred and Merino Wethers.)

Heavy (over 50 lb.)	$3\frac{1}{8}$d.	$3\frac{1}{8}$d.
Light (under 50 lb.)	$3\frac{1}{4}$d.	$3\frac{1}{4}$d.

New Zealand Lambs.

Canterbury, light (28 lb. to 36 lb.)	5d.	5d.
Canterbury, medium (36 lb. to 42 lb.)	5d.	$4\frac{7}{8}$d.
Canterbury, heavy (42 lb. to 50 lb.)	$4\frac{3}{4}$d.	$4\frac{5}{8}$d.
Southland (28 lb. to 42 lb.) ...	$4\frac{7}{8}$d.	$4\frac{3}{4}$d.
North Island (28 lb. to 42 lb.) ...	$4\frac{13}{16}$d.	$4\frac{3}{4}$d.

Australian Lambs.

30 lb. to 40 lb., best brands (28 lb. to 42 lb.)	None offering.	
30 lb. to 40 lb., fair quality (28 lb. to 42 lb.)	$3\frac{7}{8}$d.	$3\frac{7}{8}$d.
30 lb. to 40 lb., inferior quality (28 lb. to 42 lb.)	None offering.	

River Plate Lambs.

28 lb. to 42 lb.	None offering.	

New Zealand Frozen Beef.

Ox, fores (160 lb. to 220 lb.) ...	$2\frac{3}{16}$d.	$2\frac{3}{16}$d.
Ox, hinds (160 lb. to 220 lb.) ...	$3\frac{1}{4}$d.	$3\frac{1}{4}$d.

Australian Frozen Beef.

Ox, fores (160 lb. to 200 lb.) ...	None offering.	
Ox, hinds (160 lb. to 200 lb.) ...	None offering.	

River Plate Frozen Beef.

Ox, fores (160 lb. to 220 lb.) ...	$2\frac{1}{16}$d.	$2\frac{1}{16}$d.
Ox, hinds (160 lb. to 220 lb.) ...	$3\frac{1}{8}$d.	$3\frac{1}{8}$d.

Queensland Timbers.—So much interest has been evinced in the Southern markets in our Queensland hard and soft woods, and the scrub timbers suitable for ornamental work and high-class furniture, that we strongly advise holders of land containing such timbers to refrain as much as possible from des troying them. Scrub timbers, such as yellow-wood, ivory-wood, red cedar, beech, hoop, Kauri and Bunya pine, crow's ash, silky oak, and many of the acacias will all find a ready sale in the near future at remunerative prices. The same applies to the forest timbers—tallow-wood, swamp mahogany (for piles, unbarked), ironbark, grey, spotted, red, and other gums (excepting white gum), red stringy bark, &c. The great demand both locally and in South Africa for Queensland railway sleepers, bridge girders, and piles must result in higher prices, and those who are wise enough to preserve the timber on land not required for cultivation will find that timber pays better than corn. A demand has now arisen in Ceylon for satin-wood for railway sleepers. This timber, under the name of "light yellow-wood," is very plentiful both in the Southern and Northern tropical scrubs, and is now being destroyed wholesale by selectors.

General Notes.

COTTON IN QUEENSLAND.

The cotton-growing industry is making some progress in the State, but farmers have not yet sufficient confidence in the crop to induce them generally to enter upon its cultivation. Perhaps when the yields of some of the fields now being picked are made known a change will come over the spirit of the dream, and a larger aggregate area may be planted between now and October. Mr. D. Jones, of the Department of Agriculture and Stock, has shown us some very fine specimens of cotton. The bushes from which samples were taken are heavily laden with pods, and he considers that the grower will have every reason to be gratified at the heavy yield. The accompanying illustration represents a field of ripening cotton at Ropeley, in the Lockyer district. It must not be supposed that coloured labour is employed here. The dark faces of the busy pickers are the result of art, or rather, of want of art, in the photographer, and not of Nature, as the girls here depicted are, Mr. Jones says, the fairest and the finest German girls he has ever seen. The central figure is the happy mother of sixteen children. This is a scene which, some years ago, was common from Moreton Bay to the Bremer. The area of the field here depicted is about 3¼ acres. The cotton from the patch was ginned last season (1905) at the Government Ginnery, Ipswich, and realised a total of £38 12s. 4d., or at the rate of about £12 per acre. The variety planted was chiefly Russell's Big Boll. There would have been a much heavier yield had the plants not been planted too far apart, besides which many misses, as seen in the photograph, were not supplied.

With regard to the cash return of £12 per acre, it may seem to some that this is an exaggerated statement, but a farmer only a few miles from this farm in the same district obtained a cash return of £17 per acre. These statements are absolutely correct, as they are taken from the figures of the Department of Agriculture and Stock.

QUEENSLAND POULTRY IN LONDON.

The Department of Agriculture and Stock has received a report upon a consignment of about 300 poultry sent to London by the steamer "Orient." The poultry arrived in good condition, and the packing was satisfactory. The agent urged that the importance of grading fowls and ducks could not be too strongly emphasised. One or two fowls in the box might spoil the lot. He thinks that such goods from Australia, if properly put up, will always command the market against American and Russian. Fowls realised from 2s. to 3s. 6d. each; ducks, 2s. 6d. to 3s. 3d.

TRADE WITH THE EAST.

The Hon. J. H. Sternberg, M.H.R., Melbourne, lately returned from Japan, was entrusted on behalf of a strong combination to enter into arrangements, whereby frozen products from Australia will be forwarded to Japan and the East by a regular service.

Satisfactory arrangements were concluded, and it is probable an important new trade will shortly spring up with the Commonwealth. Mr. Sternberg was asked if this would involve the establishment of a new line of steamers, and replied that he could not say anything on the point at present. By the steamer with which he arrived in Japan, a large cargo of foodstuffs, besides a draft of money subscribed for the relief of the famine-stricken residents in the northern portion of the Empire, reached Tokio. Mr. Sternberg, who was associated with this contribution, was warmly thanked by many of the leading Japanese officials, who evidently greatly appreciated the generous and humane spirit which inspired the gift.—"Townsville Evening Star."

TO KEEP FLIES OFF HORSES AND CATTLE.

During the summer, both horses and cattle suffer very much from the persistent attacks of flies. In the Western districts the flies are most distressing to stock. Horses may be seen wandering restlessly about, unable to feed until the kindly shades of night afford a respite from the pest. A common sight out West is to see horses standing "heads and tails," whisking the flies off each other's faces, or they seek the lee side of a fire and stand in the smoke for hours together. Covered with great raw sores, produced by the flies, they must suffer tortures from these persistent enemies. Any remedy to give them relief will, therefore, be gladly welcomed by stockowners. The Kansas Agricultural College has, after several trials, strongly recommended Mr. F. A. Marlat's preparation, which is composed of fish oil, 2 quarts; crude carbolic oil, 1 pint; oil of penny-royal, 1 oz.; oil of tar, 10 oz.; kerosene, 1 quart. This preparation may be applied with a brush, cloth, or atomiser, and will cause the flies to leave immediately. With the college herd of thirteen calves they found that 1 gallon of this mixture would make from forty to forty-five applications, and a single application would keep the flies off from two to three days.

If the remedy be all that is claimed for it, the preparation should be generally used by horseowners.

RECORD PRICES FOR ORCHIDS.

One thousand one hundred and fifty guineas were paid at public auction last month for an *Odontoglossum crispium pittianum* orchid plant, consisting of three bulbs and a young break. The blossom is described as being most exquisite in colour and delicacy of form. At the same sale, 800 guineas were paid for a F. K. Sander, 470 guineas for an Abner Hassall, and 400 guineas for a Pittiœ. Last year 875 guineas were paid for an Odontoglossum.

We have, in Queensland, several florists who have been very successful in growing orchids. From the foregoing, it would appear that a fortune awaits the grower who can produce certain varieties. But probably, also, it would require a small fortune to obtain the bulbs wherewith to build up the fortune *in posse*.

A SPECIAL SHOW FOR GAYNDAH.

The leading men of Gayndah, including some new settlers, are making a determined effort to hold, next year, a pastoral, industrial, agricultural, and horticultural show. Gayndah is one of the oldest towns of the State, and it is certainly matter for regret, if not for censure, that, with its splendid natural advantages, this fine district should have been neglectful in providing a means by which its great resources could be made known to the world. Herein lies one of the most urgent reasons for making an effort for the future. We understand that this movement has nothing whatever to do with any existing association in Gayndah, and that it will not in any way clash with the work of other societies in the Burnett district.

QUEENSLAND AGRICULTURAL COLLEGE OLD BOYS' UNION.

The hon. secretary acknowledges receipt of the following subscriptions:—1st July to 17th July: J. O. Murray-Prior, Harold A. Hillcoat, Gordon Robertson, E. A. Byrne, D. W. Shine, P. C. Price, J. Proud, E. O. Peirce, A. J. Conachan, F. H. Cockerill, Ph. Rochat, Alan C. Lynch, R. H. Bentley, F. J. Bray, P. C. Pointon, F. O. Moody, J. W. Devereux, F. C. Ranger, E. Bushnell.

The annual dinner of the union is fixed for 9th August.

TO STOP A RUNAWAY HORSE.

Scarcely a week passes in any year that human lives are not jeopardised by horses taking fright and running away. The man who can devise some means which will surely prevent this will be a great public benefactor. Someone who professes to know states that runaway accidents seldom occur in Russia.

It is asserted that in Russia a horse that is addicted to the habit of running away has a thin cord with a running noose around his neck at the neck strap, and the end is tied to the dashboard.

A traveller says:—I saw in the Corso a phaeton with two spirited horses bolt. They were driven by a lady, and I expected to see instant destruction. But the lady coolly grasped a thin cord, and within 30 yards the horses came to a full stop. I afterwards met the lady, and expressed surprise at the skill with which she stopped the runaways.

She treated it as a trifle, and told me accidents from runaway horses are unknown in Russia, as no one but a lunatic would drive without the cord. When a horse bolts, he always takes the bit in his teeth, and the skill of the driver is useless. The moment the pressure comes on the windpipe the horse knows he has met his master.

WINE AS A GERM-DESTROYER.

In the Editor's Notes in the Western Australian "Journal of Agriculture," occurs the following paragraph:—

Dr. Dalton maintains that wines, more especially red wines, have a germicidal action upon pathogenic micro-organisms. He instances an elderly patient, who said, "It is strange that when I was young all my friends partook of wine for dinner, and one seldom heard about indigestion, stomach complaints, or appendicitis. Now, my friends are all water-drinkers, and they all suffer from these complaints. It is my opinion that wine is a germ-killer."

AGRICULTURAL AND HORTICULTURAL SHOWS.

The Editor will be glad if the secretaries of Agricultural and other Societies will, as early as possible after the fixture of their respective shows, notify him of the date, and also of any change in date which may have been decided on.

Plate XIII.

Mode of Dishorning Cattle.

Answers to Correspondents.

DEHORNING CATTLE.

J.H., Yandina—

1. Generally 2 or 3 inches are left at the base of the horn, preferably a little more.

2. To stop the bleeding, smear with thick tar.

3. Various dehorning instruments are sold. A list can be obtained from Carl Zoeller and Co., Brisbane.

It is much better to dehorn the young stock, or rather to prevent the growth of horns, by using caustic soda, as advocated in this Journal from time to time.

Our correspondent will find his questions answered in the following article supplied to us by Mr. Robert Armstrong, of Boldon, Mackay. The apparatus was invented by his brother in 1897. The accompanying illustration will explain how the work is performed:—

The method formerly adopted for performing this operation—by means of a pinchers for holding the beast by the nose, and a shears which only removed two-thirds of the horn—has been discarded by all those who dishorn a large number of cattle yearly as being most unsatisfactory; even the saw has to give way to a more modern invention. And any unbiassed onlooker can have only one opinion as to the usefulness of the machine invented by Mr. Armstrong, land steward, Bruree House, supplying as it does a long-felt want.

With the aid of a crib—which he also invented—for putting the beast into, it is possible for a man to drive in a two or three year old bull, and in four minutes let him out a dishorned bullock. To those who follow the practice of first knocking the beast down, tying up his legs, castrating him, then remove his horns with either the saw or shears, the above assertion will possess a Yankee flavour. Nevertheless, I have seen it done repeatedly.

The crib is made of wood; it is 6 feet long by 3 feet wide; in the centre a wooden door is hinged on to the bottom, but is 2 feet shorter than the crib; this is called the "squeezer." At one end an ordinary, old-fashioned bail is constructed—the movable post running between two iron bars screwed on to the top—so as to catch the beast's head. When this is done, the squeezer is pressed against him. Attached to the squeezer is a flat piece of iron about 18 inches long and 2 inches wide, with notches cut like the teeth of a saw. As the squeezer is forced against the beast, these notches hold it in its place by means of a catch screwed on the side of the crib.

For castrating, a small wooden pole is let in behind, resting on the sides of the crib. This can be moved backward or forward, according to the length of the beast, by means of two iron pegs inserted in the holes bored in the side for that purpose. The time occupied for performing these necessary details is half a minute, where efficient workmen are employed.

For dishorning, there are two pairs of holdfasts driven into the bail outside the crib, and two small iron bars passed through, one catching the beast under the jaw, the other over the nose; another bar is passed through two holdfasts inside the bail, catching the beast over the neck. The machine is then put in on the horns, and in forty seconds the beast is as pure a poley as man's ingenuity can make a shorthorn.

From the above it will be seen that from the beginning to end of the two operations no ropes or tying materials of any description are required. And Mr. Armstrong claims to be the first in the United Kingdom who has dispensed with these necessary adjuncts where the old-fashioned method is still carried on.

SUGAR-CANE ARROWING, Etc.

W. Reid, Claftonwood, Pycaley—

1. The flowers on cane are the normal steps of propagation of the cane plant, the flowers being the seed.

2. All varieties of cane are liable to flower (arrow) in some conditions of soil and climate. In true cane countries, the cane flowers every year. In non-tropical conditions varieties of cane may flower or may not flower in any year, some varieties being more liable to flower than others.

3. The sugar-cane is at all times a safe and valuable feed for cattle.

4. A cast-iron boiler for the preparing of the lime and sulphur wash will be the best (as was recommended in the Journal), but even a copper boiler would do, and is not attacked to any extent by the mixture. Most likely you allowed the heavy mixture to accumulate at some place on the bottom of the boiler, which caused the burning out.

KANGAROO RATS AND BANDICOOTS—NUTRITIVE VALUE OF WHITE AND YELLOW MAIZE.

"Cornstalk," Kerry—

1. You are experiencing what all pioneer farmers have gone through. The only remedies against the pests are shooting, trapping, poisoning by means of baits, such as sweet potatoes and strychnine, tarring the maize seed, and wire-netting. A couple of sharp fox-terriers we find very efficacious in keeping down bandicoots.

2. There is only a slight difference between the nutritive qualities of yellow and white maize. The white varieties are generally a little more starchy, and therefore are better for the manufacture of cornflour. In some of the white varieties the amount of proteids, or flesh-forming food, may be less than the average in yellow varieties, but some of the former, as, for instance, "Early White Horsetooth," contain a high amount of proteids, and also a high amount of starch.

ANONYMOUS COMMUNICATION.

J.T., Bundaberg—

The subject of your letter is unsuitable for this Journal; and, even if it were not so, we cannot publish anonymous communications.

PASPALUM WITH CLOVER.

Jno. Tait, Tewantin.—

The Director of Agriculture, Mr. Quodling, advises clover with prairie grass, but not with paspalum, as the latter will kill out most grasses. Rhodes grass would do with clover, but is very expensive at present.

CORAL LIME.

J. Unsworth, Narragon, Clump Point.—

The burning of limestone or coral for the production of quicklime is hardly practicable on a small scale. The coral or limestone has to be heated to redness, and at the same time the carbonic acid gas formed must be allowed to escape freely. For this purpose, the burning is carried on in properly constructed kilns, which are charged from the top, and the finished quicklime is drawn off at the bottom.

The Markets.

PRICES FOR FRUIT—ROMA-STREET MARKETS.

Article.	JULY. Prices.
Apples, Eating, per packer, Hobart	...
Apples, Eating, per packer, Hobart, best sorts	12s. to 14s.
Apples, American, per packer	...
Apples, Cooking, per packer	9s. to 12s.
Apples, Local, per packer	...
Apricots, quarter-case	...
Bananas, per dozen (scarce, demand for local grown)	$2\frac{3}{4}$d. to 3d. and 4d.
Bananas, per dozen	...
Cherries, quarter-case	...
Comquats, case	...
Lemons, per case, Local	5s.
Lemons, per case, Imported	6s. 6d.
Mandarins, best	3s. to 4s.
Mangoes, half-case	...
Oranges, per packer, Imported	...
Oranges, Local, per packer	2s. 6d. to 3s. 6d.
Papaw Apples, per case	...
Passion Fruit, quarter-case (scarce)	4s. 6d.
Peaches, quarter-case	...
Peanuts, per lb.	$2\frac{1}{2}$d.
Pears, Imported, per quarter-case	6s.
Pineapples (rough leaf), best sorts, per dozen	2s. 6d. to 3s.
Pineapples (smooth leaf), best sorts, per dozen	4s. to 4s. 6d.
Plums, Imported, quarter-case	...
Plums, Local, quarter-case	...
Quinces, Imported, per case	...
Rockmelons, per dozen	...
Strawberries, per tray	2s. 6d. to 3s.
Tomatoes, quarter-case	1s. 6d. to 2s.
Watermelons, per dozen	...
SOUTHERN FRUIT MARKET.	
Bananas, Fiji, per case	10s. to 11s. 6d.
,, ,, per bunch	2s. 6d. to 6s.
Chillies, per bushel	4s. to 4s. 6d.
Lemons, per gin case	...
Mandarins, case	8s. to 12s.
Oranges, per case	4s. to 10s.
,, Washington Navels, per packer	5s. to 6s.
Passion Fruit, per gin case	4s. to 12s.
Peaches, half-case	...
Pineapples, case	9s. 6d.
,, per double case	...
Quinces, per case	2s. 6d. to 4s. 6d.
Rockmelons, case	...
Tomatoes, case	4s. to 4s. 6d.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JULY.

Article.		JULY. Prices.
Bacon (Pineapple)	lb.	$5\frac{1}{2}$d. to 7d.
Barley, Malting	bush.	...
Bran	ton	£5 5s.
Butter, Factory	lb.	$10\frac{1}{2}$d.
Chaff, Mixed	ton	£4
Chaff, Oaten	"	£4 5s. to £4 7s. 6d.
Chaff, Lucerne	"	£4 5s. to £5 5s.
Chaff, Wheaten	"	£3
Cheese	lb.	6d. to $6\frac{1}{2}$d.
Flour	ton	...
Hay, Oaten	"	£5 5s. to £5 10s.
Hay, Lucerne	"	£3 17s. 6d. to £4 8s. 4d.
Honey	lb.	2d. to 3d.
Maize	bush.	2s. $6\frac{1}{2}$d. to 2s. 10d.
Oats	"	3s. 6d.
Pollard	ton	£5 5s.
Potatoes	"	£7 10s. to £10 1s. 8d.
Potatoes, Sweet	"	...
Pumpkins	"	...
Wheat, Milling	bush.	4s. 2d.
Wheat, Chick	"	3s. 6d. to 4s. 1d.
Onions	ton	£8 12s. 6d. to £9
Hams	lb.	9d. to $10\frac{1}{2}$d.
Eggs	doz.	$8\frac{3}{4}$d. to 1s. $3\frac{1}{2}$d.
Fowls	pair	2s. $2\frac{1}{4}$d. to 3s. 6d.
Geese	"	5s. 3d. to 6s.
Ducks, English	"	2s. $10\frac{1}{2}$d. to 3s. $6\frac{1}{4}$d.
Ducks, Muscovy	"	3s. $1\frac{1}{2}$d. to 3s. 6d.
Turkeys, Hens	"	5s. 1d. to 6s. $4\frac{1}{2}$d.
Turkeys, Gobblers	"	9s. $2\frac{1}{4}$d. to 10s. 6d.

ENOGGERA SALES.

Animal.	JUNE. Prices.
Bullocks	£9 15s. to £10 15s.
Cows	£6 2s. 6d. to £8 5s.
Merino Wethers	24s. 6d.
" Ewes	17s. 3d.
C.B. Wethers	27s. 3d.
" Ewes	21s. 9d.
Lambs	17s. 6d.
Pigs	...

Patents.

RECENTLY PATENTED INVENTIONS OF INTEREST TO FARMERS.

The following recent patents we take from the "Scientific American":—

WHEAT-SHOCKER.—G. R. Keltner, Covington, Oklahoma Ter. This shocker is adapted for attachment to a harvesting machine, taking the place of the bundle-carrier, and so located with reference to the harvester as to receive bundles from the binding table. As it receives the bundles they are fed in standing position, but downward, upon a platform, and are packed in curved guard-arms, and wherein the platform is slid from beneath the packed bundles, which are received on horizontal fingers; which being automatically dropped the bundles slide to the ground, and platform returns to normal position to receive other bundles.

GRAIN-CONVEYER.—J. W. Schauer, Kalispell, Mont. Mr. Schauer's invention has for its aim the provision of a simple and efficient grain-conveyer for use in connection with threshing machines, and especially in connection with those employing a band-cutter and feeder. A great saving of manual labour is effected in supplying bundles to the threshing machine.

CORN-SNAPPER AND FEED-CUTTER.—F. T. Martin, Winchester, Ky. In this instance the invention has for its object the provision of a machine adapted to take the stalks of corn as cut from the field with the fodder and ears still connected to the stalks, and to snap or tear off the ears from the stalks, and, in the same operation, cut the stalks and blades into short lengths for rough feed.

BROOM-CORN-CUTTING MACHINE.—C. R. Huckleberry, Paris, Ill. The design in this case is to provide a machine which may be drawn across a field by a team to rapidly cut the broom-corn, and the machine is so constructed and arranged as to even the varying lengths of the cut-off brush ends, and trim off the superfluous butt-ends of the stalks of the longer brush ends, so as to bring them all to the same length before being delivered to the binder, which binds them in bundles.

DRAFT-EQUALISER.—H. C. Scott, Ritzville, Wash. The object of the invention is to provide an equaliser arranged to distribute the load to be hauled equally to the animals in the team, to reduce the friction of the working parts to a minimum, and to provide a comparatively short but very strong and durable equaliser, not liable to get out of order nor cause entanglement to the animals when not in use.

Orchard Notes for September.

By ALBERT H. BENSON.

The planting and pruning of all deciduous trees should have been completed even in the coldest districts by the end of August, and during the present month the orchardist should disbud and thumb-prune the young trees as soon as they start out into growth. Judicious thumb-pruning is necessary in order to reduce the number of branches, only those buds being allowed to develop into branches that will be required to form the future head of the tree, all the rest being either removed or, better still, pinched back and converted into spurs which will eventually bear fruit, and which, meanwhile, will produce a tuft of leaves that will tend to strengthen the branch and protect it from sunburn. Spraying should be continued during the month in the case of deciduous trees attacked

by fungus diseases, such as the shot-hole fungus or rust of the apricot and the Windsor pear blight of pears, the material used being Bordeaux mixture. Where leaf-eating insects of any kind are troublesome, a little Paris green—1 oz. to 10 gallons—should be added to the Bordeaux mixture, the spraying material being then both an insecticide and fungicide, and two pests are destroyed by the one spraying. Vines that have not been treated for black spot, as described in the Orchard Notes for August, should be treated at once; and vine-planting should be done during the beginning of the month, though if the cuttings have been kept in a cold place planting can be continued all through the month. In planting grape-cuttings, see that the cutting is always planted firmly, and that the soil comes into direct touch with it all round, as, if not, it is very apt to dry out. Plant the cutting with the top eye just on a level with, or rather slightly below, the surface of the ground, not with 6 inches or more of the cutting sticking out of the ground, as the nearer to the ground the main stem of the vine starts the better the vine will be, and the easier will be its subsequent training.

Orange-trees will be in full blossom during the month, and in the earlier districts the young fruit will probably be ready to treat for Maori or rust towards the end of the month. Maori is caused by a very small mite, which begins its attack on the young fruit when it is about the size of a marble, though the injury it causes is seldom noticeable till the fruit begins to ripen. Spraying the trees with a mixture of sulphur and soft soap or with a weak solution of sulphide of soda, or dusting the trees with fine sulphur, will destroy these mites. During the end of the month pineapple and banana suckers may be set out during favourable weather in the earlier districts, but it is not advisable to plant out too early, as they do not root readily till the soil is thoroughly well warmed. Orchards and vineyards should be kept well cultivated during the month, as if there is a dry spring the success of the crop will depend very much on the manner in which the orchard is kept, as the better the orchard is cultivated the longer it will retain the moisture required by the trees for the proper development of their fruit. Quickly-acting manures, such as sulphate of potash, sulphate of ammonia, and superphosphate, can be applied to fruit trees during the month if there is any suitable showery weather, but should not be applied during either a very dry or a very wet spell. Fruit trees should be mulched, and when cow peas are required for mulching they can be planted towards the end of the month.

During the month a careful examination should be made of all fruit to see if any contains larvæ of fruit fly; and if such are found they should be destroyed, as if extreme care is taken during this and the two following months to destroy the larvæ of all fruit flies, whenever and wherever found, this great curse of the fruitgrower would be greatly reduced, as it is on the careful destruction of the earlier broods of flies that the saving of the main crop of fruit will principally depend. Though the first damage caused by the flies is comparatively insignificant, they reproduce themselves so rapidly that a few mature insects in the beginning of the season become many thousands before it closes.

Farm and Garden Notes for September.

Field.—Springtime has now arrived, and with it there will be the usual trouble with weeds, especially on carelessly cultivated land. Therefore, the cultivator—the hoe (horse or hand)—must be kept vigorously at work to check the weed pests, and save the growing crops and much future labour. Attend to earthing up any crops which may require it. There may possibly occur drying winds and dry weather; still, good showers may be looked for in

October, and much useful work may be done during the present month, which will afford a fair prospect of a return for labour. Plant out *Agave rigida, var. sisalana* (sisal hemp plant), in rows 8 feet apart each way, on rich soil, or 7 feet by 7 feet on poor lands. All *dry* places on the farm too rocky or poor for ordinary crops should be planted with this valuable aloe. If the soil is very poor, and the plants very small, it is better to put the small plants out in a nursery of good soil, about 2 feet apart. Next year they will be good-sized plants. Keep down tall weeds in the plantation, and do not allow couch grass to grow round the roots. The Agave will do no good if planted in low, wet land, or on a purely sandy soil. It thrives best where there is plenty of lime, potash, and phosphoric acid, all of which can be cheaply supplied if wanting in the soil. Sow maize, sorghum, imphee, prairie grass, panicum, tobacco, and pumpkins. Sugar-cane planting should be vigorously carried on. Plant sweet potatoes, yams, earth or pea nuts, arrowroot, turmeric, ginger, and canaigre (bulb yielding a valuable tanning substance). Plant out coffee.

Kitchen Garden.—Now is the time when the kitchen garden will richly repay all the labour bestowed upon it, for it is the month for sowing most kinds of vegetables. If the soil is not naturally rich, make it so by a liberal application of stable manure and compost; dig or plough the ground deeply, and afterwards keep the surface in good tilth about the crops. Water early in the morning or late in the evening, and stir the soil in the latter case early next day, to prevent caking. Mulching with straw or leaves or litter will be of great benefit as the season gets hotter. It is a good thing to apply a little salt to newly dug beds. It is not exactly known what the action of the salt is on the soil, but when it is applied as a top-dressing it tends to check rank growth. A little is excellent for cabbages, but too much renders the soil sterile, and causes hardpan to form. French or kidney beans may now be sown in all parts of the State. The Lima bean delights in the hottest weather. Sow the dwarf kinds in drills 3 feet apart and 18 inches between the plants, and the climbing sorts 6 feet each way. Sow cucumbers, melons, marrows, and squashes at once. If they are troubled by the beetle, spray with Paris green or London purple. In the June issue of the Journal, Mr. S. C. Voller gave an excellent recipe for a spray for vegetables. In cool districts peas, and even some beetroot, may be sown. Set out egg plants in rows 4 feet apart. Plant out tomatoes, $3\frac{1}{2}$ feet each way, and train them to a single stem, either on stakes, trellis, or wire netting. Plant out rosellas. Sow mustard and cress, spinach, lettuce, vegetable marrows, custard marrows, parsnips, carrots, eschalots, cabbage, radishes, kohl rabi, &c. These will all prove satisfactory, provided the ground is well worked, kept clean, and that water, manure, and, where required, shade, are provided.

Flower Garden.—Continue to plant bulbs as directed last month. Protect the plants as much as possible from cold westerly winds, which may still occur, notwithstanding the increasing temperature. Keep a good lookout for slugs. Plant out chrysanthemums, palms, and all kinds of tropical and semi-tropical plants. If hot weather should ensue after planting, water and shade must be given. Sow dianthus, snapdragon, coleus. Roses will now be in full bloom. Keep them free from aphis, and cut off all spent blooms. This latter work should be done in the case of all flowers. If you wish to save seeds, do not wait for the very last blooms, but allow some of the very best to go to seed. If you have any toads in the garden or bush-house, be careful not to destroy them, but encourage them to take up their abode there. They are perfectly harmless, in spite of their ugliness, and they destroy an astonishing number of insects injurious to plants. Fill up all vacancies with herbaceous plants. Sow zinnia, galliardia, amaranthus, cockscomb, balsam, sunflower, marigold, cosmos, summer chrysanthemums, coreopsis, portulacca, mesembryanthum, colendula, &c.

LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Allora ...	Central Downs Agricultural and Horticultural Association	J. H. Buxton ...		
Allora ...	The Allora Farmers' Progress Association	P. Donovan ...		
Amby ...	Amby Farmers' Association	W. Jas. Sullivan ...		
Atherton ...	Barron Valley Agricultural, Pastoral, and Industrial Association	G. Bardon	5 and 6 July	4 and 5 July
Atherton ...	The Atherton District Farmers' Association	Fredk. Stewart ...		
Avondale ...	Avondale Farmers and Planters' Association	Edward J. Gayland		
Ayr	Lower Burdekin Farmers' Association	G. S. Mackersie ...		
Ayr	Lower Burdekin Pastoral, Agricultural, and Industrial Association	Philip Grout ...		
Ballandean ...	Lyra Farmers' Progress Association	M. B. Marlay ...		
Beaudesert ...	Logan and Albert Pastoral and Agricultural Society	A. Winship ...	20 June	8 May
Beenleigh ...	Agricultural and Pastoral Society of Southern Queensland	Wilson Holliday ...	15 Sept.	28 Sept.
Beenleigh ...	Logan Farming and Industrial Association	Wm. G. Winnett, Loganlea		
Biggenden ...	Biggenden Agricultural and Pastoral Society	C. J. Stephensen ...	6 and 7 July	5 and 6 July
Birthamba ...	New Hope Farmers' Association ...	G. W. Nixon ...		
Blackbutt ...	Farmers' Progress Association ...	John Dreghorn ...		
Boonah ...	Fassifern and Dugandan Agricultural and Pastoral Association	C. E. Mackenzie ...	17 and 18 May	6 and 7 June
Booyal ...	Booyal Farmers' Progress Association	Thos. Skillington ..		
Bowen ...	Pastoral, Agricultural, and Mining Association	Geo. Turner ...	11 Aug	17 Aug.
Bowen ...	Proserpine Farmers and Settlers' Association	R. Toogood ...		
Bowen (Proserpine)	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Bowenville (Gordon Vale)	Moola Farmers' Progress Association	Alex. Gordon ...		
Brisbane ...	Horticultural Society of Queensland	F. W. Woodruffe ...	...	24 and 25 April
Brisbane ...	Queensland Acclimatisation Society	E. Grimley ...		
Brisbane ...	National Agricultural and Industrial Association of Queensland	Charles A. Arvier	8, 9, 10, and 11 Aug.	7, 8, 9, 10, and 11 Aug.
Brisbane ...	Queensland Nurserymen's Association	S. C. Matthews ...		
Brisbane ...	United Pastoralists' Association ...	Fredk. Ranson ...		
Brisbane ...	Queensland Chamber of Agriculture	F. W. Peek ...		
Brisbane ...	Queensland Citrus-growers' Asssociation	R. M. Cooper ...		
Brisbane ...	Combined Moreton Association ...	Wm. Ewart ..		
Brookfield ...	The Brookfield and Pullen Vale Farmers, Dairymen, and Fruitgrowers' Association	W. R. Moon ...		
Brooyar ...	Brooyar Farmers' Progress Association	E. Pike		
Buderim ...	Buderim Mountain Coffee and Fruitgrowers' Association	G. O. Burnett ...		
Buderim Mt.	North Coast Central Associatfon ...	James Lindsay ...		
Bundaberg ...	Bundaberg Horticultural and Industrial Society	H. E. Ashley ...		
Bundaberg ...	Council of Agriculture	H. J. Page ...		
Bundaberg ...	Woongarra Canegrowers and Farmers' Association	F. Watson ...		
Bundaberg ...	Bundaberg Agricultural, Pastoral, and Industrial Society	H. J. Page ...	14 and 15 June	26 and 27 Sept.
Burpengary...	Burpengary Farmers' Association ...	F. W. Uhlmann ...		
Byrnestown...	Byrnestown Farmers' Progress Association	Chr. H. Fredriksen		
Caboolture ...	Upper Caboolture Farmers' Association	Jos. Wilson ...		
Cairns ...	Aloombah Farmers' Association ...	N. P. Petersen ...		
Cairns ...	Cairns Agricultural, Pastoral, and Mining Association	J. Reid	7 and 8 Sept.	30 and 31 Aug.
Cairns ...	Cairns District Coffee-growers' Association	L. Battinson ...		
Cairns ...	Cairns District United Farmers' Association	Wm. Griffin ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Cardwell ...	Rockingham Progress Association ...	T. E. Fitzsimmons		
Charleville ...	Central Warrego Pastoral and Agricultural Association	G. M. Bell		
Charters Towers	Towers Pastoral, Agricultural, and Mining Association	A. H. Pritchard ...	31 May, and 1, 2, 3 June	31 May, and 1, 2 June
Childers ...	Isis Agricultural Association	H. Epps		
Childers ...	Doolbi Mill Branch, Isis Agricultural Association	W. T. H. Job ...		
Childers ...	Childers Mill Branch, Isis Agricultural Association	H. Epps		
Childers ...	Childers Pastoral, Agricultural, and Industrial Society	A. Eastaughffe ...	1 and 2 June	14 and 15 June
Childers ...	The Childers Mill Canegrowers' Association	A. Eastaughffe ...		
Clermont ...	Peak Downs Pastoral, Horticultural, and Agricultural Society	F. Leysley		
Clermont ...	Peak Downs Dairymen and Settlers' Association	A. G. Pursell ...		
Cleveland ...	Cleveland Horticultural Society ...	Miles R. Fox ...	14 Oct.	
Clifton ...	Darling Downs Pastoral, Agricultural, and Industrial Association	S. J. B. Just ...	13 Sept.	12 Sept.
Coochin ...	The Coochin Farmers' Progress Association	J. T. W. McLaughlin		
Cooyar ...	Yeraman Creek Farmers' Progress Association	George Seely ...		
Cooran ...	Cooran Progress and Agricultural Association	Thos. Smith ...		
Cordalba ...	Cordalba Farmers' Association ...	J. Jeffrey		
Coulson ...	Coulson Farmers' Progress Association	G. R. Johnson ...		
Crow's Nest	The Crow's Nest Agricultural and Horticultural Society	James Gleeson ...	26 July	24 and 25 July
Croydon ...	The Gulf Mining, Pastoral, and Industrial Association	V. Creagh		
Cunnamulla	South Warrego Pastoral Association	J. Winward ...		
Dalby ...	Northern Downs Pastoral and Agricultural Association	E. Watt	26 and 27 July	25 and 26 July
Dallarnil Scrub, *viâ* Degilbo	Dallarnil Farmers' Association ...	Vincent H. Jones		
Danderoo ...	Danderoo Farmers' Progress Association	T. Campbe ...		
Deception Bay	Deception Bay Farmers' Association	B. J. T. Liscombe		
Degilbo ..	Degilbo District Farmers' Association	J. P. Laugher ...		
Dundowran, *viâ* Maryborough	Dundowran and Takura Settlers' Association	H. J. E. Tooth ...		
Esk	Esk Agricultural, Pastoral, and Industrial Society	Thos. C. Pryde ...	24 and 25 May	29 and 30 May
Eudlo ...	Eudlo Farmers and Fruitgrowers' Progress Association	Walter T. Jeremy		
Flagstone Creek, *viâ* Helidon	Flagstone Creek Farmers' Progress Association	James Scanlan ...		
Forest Hill ...	Forest Hill Agricultural and Progress Association	Wm. Jones ...		
Geraldton ...	Johnstone River Sugar-growers and Manufacturers' Association	Ralph Reid ...		
Gin Gin ...	Currajong and Gin Gin Agricultural and Pastoral Society	J. R. Hamilton ...	24 May	28 May
Gladstone ...	Gladstone Pastoral and Agricultural Association	W. J. Manning ...		
Gladstone ...	Port Curtis Agricultural, Pastoral, and Mining Association	J. T. S. Brown ...		
Gooburrum, Bundaberg	Gooburrum Farmers and Canegrowers' Association	W. J. Tutin ...		
Goombungee	Goombungee Farmers' Association...	Thos. Smith ...		
Goondiwindi	MacIntyre River Pastoral and Agricultural Society	E. T. Drake ...	...	1 and 2 May
Goondoon, *viâ* Bundaberg	Goondoon Farmers' Association ...	J. F. Cory		
Gracemere ...	The Gracemere District Farmers and Progress Association	Arthur E. Fisher...		
Gympie ...	Agricultural, Mining, and Pastoral Society	F. Vaughan ...	13 and 14 Sept.	15 and 16 Aug.

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Gympie ...	Chatsworth Farmers' Progress Association	W. Allen		
Gympie ...	Deep Creek Farmers' Progress Association	H. Bath		
Gympie ...	Gympie Horticultural Society ..	Charles Brasch ...		
Gympie ...	Imbil Road Farmers and Settlers' Progress Association	D. J. O'Farrell ...		
Hambledon (Cairns)	Hambledon Planters' Association ...	W. L. Hawkins ..		
Harrisville ...	Harrisville Farmers' Progress Association	W. J. Burnett ...		
Haslemore, Victoria, Herbert Riv.	Herbert River Farmers' League ...	Alfred Henry ...		
Headington Hill	Headington Hill Farmers' Progress Association	J. E. Stehn ...		
Helidon ...	Helidon Scrub Farmers' Progress Association	James Sweeney ...		
Helidon ...	Monkey Creek Farmers' Progress Association, Withcott, Helidon	Thomas Turner ...		
Hendra ...	Nundah Agricultural, Horticultural, and Industrial Association	Geo. A. Patullo ...	28 Oct.	13 Oct.
Herbert River	Halifax Planters' Club	A. Campbell ...		
Herbert River	Macknade Farmers' Association ...	Edwin S. Waller ...		
Herbert River	Ripple Creek Farmers' Association ...	J. W. Grimes ...		
Herbert River	Fairford Farmers' Association ...	D. G. Scott ...		
Herbert River	United Farmers' Association ...	D. G. Scott ...		
Herberton ...	Mining, Pastoral, and Agricultural Association	John M. Hollway	...	22 and 23 May
Hodgson ...	Hodgson Farmers' Association ...	Fred. Warner ...		
Home Creek, *via* Wondai	Home Creek Farmers' Progress Association	A. Iker		
Hopetoun ...	Hopetoun Pastoral, Agricultural, and Progressive Association	John Walsh ...		
Hughenden...	Hughenden Pastoral and Agricultural Association	H. G. McLean ...	19 and 20 June	
Ingham ...	Fairfield Farmers' Association ..	B. Lynn		
Ingham ...	Gairloch Farmers' Association ...	B. Lynn		
Ingham ...	Herbert River Pastoral and Agricultural Association (Agricultural Show)	P. J. Cochrane ...	8 and 9 Sept.	
Ingham ...	Stone River Farmers' Association ...	F. A. Rankin ...		
Ingham ...	Victoria Farmers' Association ...	W. C. S. Warren...		
Ipswich ...	Ipswich and West Moreton Agricultural and Horticultural Society	P. W. Cameron ...		
Ipswich ...	Queensland Pastoral and Agricultural Society	J. McGill	14 and 15 June	20 and 21 June
Kelsey Creek *viâ* Bowen	Kelsey Creek Farmers' Progress Association	A. Fontaine ...		
Kolan, North	Kolan Canegrowers and Farmers' Association	Jas. H. Hendy ...		
Kilkivan ...	Kilkivan District Farmers and Settlers' Progress Association	J. H. McKewen ...		
Killarney ...	Killarney Farmers' Association ...	J. H Hansen ...		
Kingaroy ...	South Burnett Agricultural, Pastoral, and Industrial Society	T. J. Lacey ...	...	3 and 4 July
Laidley ...	Lockyer Agricultural and Industrial Society (at Gatton)	W. A. McIlwraith	13 July	4 and 5 July
Lakeside ...	Mungore Farmers' Association ...	C. C. Ridley ...		
Lillydale, Helidon	The Flagstone Creek Farmers' Progress Association	Danl. Ryan ...		
Longreach ...	Longreach Pastoral and Agricultural Society	J. P. Peterson ...	8 and 9 May	1 and 2 May
Lucinda Point	Victoria Farmers' Association ...	W. S. C. Warren...		
Ma Ma Creek, *viâ* Grantham	Ma Ma Creek Farmers' Progress Association	Joseph Turner ...		
Mackay ...	Agricultural, Pastoral, and Mining Association	F. Black		
Mackay ...	Pioneer River Farmers' and Graziers' Association	E. Swayne	7 and 8 June	20 and 21 June
Mackay ...	The Mackay and District Horticultural Society	Fred. Bourne ...		
Mapleton ...	Fruitgrowers and Farmers' Progressive Association	W. J. Smith ...		
Maroochy ...	Bli Bli Farmers' Progressive and Industrial Association	H. A. Keil... ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Maryborough	Maryborough Horticultural Society...	H. A. Jones ...		
Maryborough	The Island Farmers' Progress Association	H. Simpson, junr.		
Maryborough	Wide Bay and Burnett Pastoral and Agricultural Society	A. H. Jones ...	19, 20, and 21 July	23, 24, and 25 May
Miriam Vale	Miriam Vale Farmers' Association	J. Spencer		
Montville ...	Montville Fruitgrowers and Farmers' Progress Association	C. J. Wyer ...		
Mooloolah ...	Mooloolah Farmers' and Fruitgrowers' Progress Association	G. S. Skerman ...		
Mooloolah ...	The United Progress Association, Caboolture, No. 1 Division	C. Court ...		
Mosman River	Mosman River Farmers' Association	Geo. W. Muntz ...		
Mosman ...	Mosman District Agricultural Society	G. W. Muntz ...		
Mount Cotton	Mount Cotton and Redland Bay Fruitgrowers and Farmers' Association	W. E. Burns ...		
Mount Marlow	Cannon Valley Farmers and Settlers' Association	R. E. Traill ...		
Mount Mee...	Mount Mee Farmers' Association ...	Jas. H. Robinson ...		
Mount Morgan	Mount Morgan Agricultural, Pastoral, and Poultry Society	J. S. Lyle ...		
Mount Ubi, Eumundi	The Kenilworth Farmers' Association	Alex. Purdon ...		
Nambour ...	The Rosemount Association	George Etheridge		
Nambour ...	Dulong and Kureelpa Farmers' and Canegrowers' Association	A. A. Petrie ...		
Nambour ...	The Obi Obi Farmers and Dairymen's Progressive Association	A. D. Crichton ...		
Nanango ...	Nanango Agricultural, Pastoral, and Mineral Society	J. W. Sigley ...	12 and 13 April	9 and 10 May
Nanango ...	Coolabunia Farmers' Association ...	Ezra Horne ...		
Nanango ...	Malar Farmers' Association	A. Becker		
Nerang ...	Southern Queensland and Border Agricultural and Pastoral Association	H. J. Cooper ...	13 Oct.	14 Sept.
North Isis ...	North Isis Canegrowers' Association	T. E. Barnes ...		
North Pine ...	Moreton Agricultural, Horticultural, and Industrial Association	N. McKenzie ...		
Oakey ...	Oakey Agricultural and Pastoral Society	E. R. Pace		
Palmwoods ...	Palmwoods Industrial Fruitgrowers' Progress Association	H. Taylor		
Peachester, *viâ* Beerwah, N.C. Line	The Peachester Progress Association	R. G. Denny ...		
Pittsworth ...	Pittsworth Pastoral, Agricultural, and Horticultural Association	C. Longland ...	7 and 8 Feb.	31 Jan.
Pomona ...	Pomona Agricultural and Progress Association	H. Armitage, senr.		
Port Douglas	Port Douglas and Mosman Pastoral, Agricultural, Horticultural, and Mining Association	N. Fynn		
Port Douglas	Daintree Farmers' Association ...	J. Carlos Allen Donally		
Proserpine ...	Preston Farmers' and Settlers' Association	R. C. Dagg ...		
Roadvale ...	Roadvale Progress Association ...	Henry Clark ..		
Rockhampton	Alton Downs Farmers' Association...	Thos. Thomasson...		
Rockhampton	Central Queensland Farmers and Selectors' Association	T. Whitely, Coowonga		
Rockhampton	Central Queensland Stockowners' Association	R. R. Dawbarn ...		
Rockhampton	Rockhampton Agricultural Society...	A. S. Tompson ...	16 and 17 June	22 and 23 June
Roma ...	Western Pastoral and Agricultural Association of Queensland	Angus McPherson	18 and 19 July	17 and 18 July
Roma ...	Yingerbay Farmers' Association ...	R. Frederick ...		
Roma ...	Roma Farmers' Association	Duncan Brown ...		
Roma (Blythedale)	Warooby Farmers' Association ...	S. S. Jones... ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1905.	1906.
Rosewood ...	Farmers' Club	P. H. Adams ...	and 7 Sept.	5 and 6 Sept.
Sandgate ...	Queensland Beekeepers' Association	A. H. W. Clarkson		
South Kolan	South Kolan Farmers and Planters' Association	John Whalley ...		
Southport ..	Southport Horticultural Society ...	E. Fass		
Spring Bluff	Aubigny Farmers' Progress Association	J. R. Torbock ...		
Springsure ...	Queensland Pastoral Society... ...	G. R. Milliken ...		
Stanthorpe ...	Border Pastoral, Agricultural, and Mining Society	Geo. Simcocks ...	9 and 10 Feb.	22, 23, and 24 Feb.
Stanwell ...	The Stanwell Agricultural Society ...	A. Spanner ...		
Stanwell ...	Stanwell District Farmers' Agricultural and Progress Association	W. Crowe		
St. George ...	Balonne Pastoral and Agricultural Association	T. M. Cummings ...		
Sunnybank ...	The Runcorn and Sunnybank Agricultural Society	S. Robertson ...		
Taabinga ...	The Taabinga Farmers' Progress Association	T. Pass		
Tannymorel, *viâ* Warwick	The Tannymorel Farmers' Progressive Association	Maurice Clifford ...		
Teutoberg ...	Teutoberg Farmers' Progress Association	E. M. Nothling ...		
Tiaro	Tiaro District Farmers' Progress Association	L. H. Riddles ...		
Tinana ...	Tinana Fruitgrowers and Farmers' Association	H. G. Habler ...		
Toowoomba...	Queensland Vine and Fruit Growers' Association	Hy. A. Tardent ...		
Toowoomba...	Royal Agricultural Society of Queensland	G. A. Leichney ...	1, 2, 3, and 4 Aug.	1, 2, and 3 Aug.
Townsville ...	Townsville Pastoral, Agricultural, and Industrial Association (formerly North Queensland Pastoral and Agricultural Association)	J. N. Parkes ...	6, 7, and 8 June	6 and 7 June
Upper Kedron	Upper Kedron Fruitgrowers and Farmers' Association	A. Marshall ...		
Upper North Pine	Upper North Pine Farmers' Association	J. Skerman ...		
Wallumbilla	Wallumbilla Farmers' Association ...	Edmund H. Yates		
Warren Siding	The Stanwell United District Farmers' Union	G. N. Terry ...		
Warwick ...	Eastern Downs Horticultural and Agricultural Association	F. H. Selke ...	15 and 16 Feb.	13, 14, and 15 Feb.
Wellington Point	Wellington Point Agricultural, Horticultural, and Industrial Association	Louis Hugonin ...	15 July	14 July
West Haldon, *viâ* Greenmount	West Haldon Farmers' Progress Association	A. E. Ayris ...		
Wondai ..	Mondure Farmers' Progress Association	W. E. Horne ...		
Woodend ...	Warren-Woodend Farmers' Club ...	W. Lehfeldt ...		
Woodford ...	Woodford Progressive Industrial Association	E. Heaton		
Woombye ...	Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society	P. S. Hungerford...	12 and 13 July	11 and 12 July
Woombye ...	Woombye Fruitgrowers' and Progress Association	E. E. McNall ...		
Woondum ...	Woondum Farmers' and Planters' Association	Chas. E. Gambling		
Wooroolin, *viâ* Nanango	Wooroolin Farmers' Progress Association	A. Deighton ...		
Yandina ...	Yandina-Maroochy Progress Association	Chas. Ablin ...		
Zillmere ...	Zillmere Horticultural Society ...	J. Voigt		

Public Announcements.

The Editor will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the Editor, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, covers in boards and cloth will be supplied from this office on application to the Under Secretary for Agriculture and Stock. Applications must be accompanied by a remittance of Sixpence to cover cost. For the convenience of those who are not within reach of a bookbinder, a Special Cover has been designed, which obviates the necessity for binding. These covers will be supplied at One Shilling each.

In order to avoid disappointment, correspondents who wish for replies to questions in the *Journal* are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

For the information of those who are desirous of communicating with the managers of State farms, we give their names and addresses below:—Queensland Agricultural College, Gatton, principal, J. Mahon; Westbrook State Farm, Westbrook, manager, C. Ross; Biggenden State Farm, Biggenden, manager, D. Macpherson; Hermitage State Farm, Warwick, manager, Alexander Martin; Gindie State Farm, manager, R. Jarrott; Kamerunga State Nursery, Cairns, manager, Howard Newport; Botanic Gardens, director, J. F. Bailey.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

STATE NURSERY, KAMERUNGA, CAIRNS.

RUBBER SEEDS FOR SALE.

The Manager of the Kamerunga State Nursery notifies that SEEDS of the RUBBER-TREE (*Castilloa elastica*), which are of very short vitality, are available at the Nursery for distribution. As these seeds cannot be guaranteed for more than a few weeks, Immediate Application should be made for them. COCOA PLANTS, raised from last year's seed, can also be obtained.

Price of Cocoa Plants, 6d. each; a reduction being made per dozen.

Rubber Seed, 6d. per ounce.

A Small Charge will be made for other Plants, Cuttings, and Seeds. A List of Prices may be obtained on application to the Manager, Kamerunga.

QUEENSLAND AGRICULTURAL COLLEGE.

The College, which is situated within 4 miles of Gatton and 1 mile from the College Railway Siding, comprises 1,692 acres, and the buildings can accommodate 60 Students.

TERMS.

Twenty-seven Pounds per annum, paid half-yearly in advance. Students are also charged One Pound per annum each for medical attendance, the sports fund, and for guarantee fee.

The course of instruction includes PRACTICAL AGRICULTURE in all its branches, DAIRYING, GARDENING, STOCK-BREEDING, and MECHANICAL ARTS. Classes are also held daily for THEORETICAL INSTRUCTION in these branches, as well as in SURVEYING, CHEMISTRY, &c.

The College Calendar, giving full particulars, may be obtained on application to the Principal at the College, or to the Under Secretary for Agriculture and Stock, Brisbane.

BURSARIES.

Four bursaries are given annually. An examination for these is held in June or July of each year. Bursaries will be awarded upon the following conditions:—Candidates (males) to be from fifteen to seventeen years of age, of sound constitution, and in good health; they must have resided in the State for the two years immediately preceding the time of their examination for such bursary, or their parents must have resided in the State three years immediately preceding such examination. The bursar is entitled—subject to good behaviour and the pleasure of Parliament—to free board and instruction as a resident student for a period of three years. He is required to take up his residence at the College within one month of the publication of the results of the examination; otherwise he forfeits his right to a bursary.

"THE SHEARERS AND SUGAR WORKERS ACCOMMODATION ACT OF 1905."

The following are the principal provisions of the Act which apply to shearing-sheds, sugar plantations, and sugar works, in connection with which not less than nine shearers or sugar workers are employed. This Act requires that the employer shall provide accommodation proper and sufficient for the shearers and sugar workers employed by him, separate from the shearing-shed or sugar works, and—

1. The buildings used for sleeping must be divided into compartments, each to accommodate not more than four persons;
2. Where persons of Asiatic race are employed, a separate building must be provided for their sleeping accommodation;
3. Two hundred and forty cubic feet of air space must be allowed for each person sleeping in a building;
4. A sleeping-room must not be used for cooking or the serving of meals;
5. When cooking is carried on in the same room as that in which meals are taken, the cooking must be done at one end of the room, and the meals must be taken at the other end. Separate dining accommodation to be provided for all Asiatics employed;
6. In the case of sugar workers, sleeping and dining accommodation must be in a separate building to that provided for Pacific Islanders;
7. Privy accommodation in the case of shearing-sheds must be not less than 25 yards from the buildings and 100 yards from the water supply, and at sugar works the privy shall not be less than 25 yards from the water supply or 100 yards if a cesspit is used;
8. Sugar works dining rooms must be 50 yards at least from open drains for the conveyance of sewage and liquid refuse, and the drain must have a proper fall;
9. The employer is charged with the provision of light and ventilation in the dining and sleeping rooms, the floors of which must be made of suitable material. These rooms must be fumigated and disinfected at least once a year. The supply of good drinking water, cooking and washing utensils, will also be a charge upon employer;
10. The persons using the buildings set apart for the accommodation of shearers or sugar workers have to keep such buildings clean, and if they neglect their duty in this respect after notice in writing by an inspector, the employer may have the building cleaned and deduct the cost from the wages due to those offending or recover in a court of justice, but the amount to be recovered shall not exceed £5 for the expense referred to;
11. Every employer must, not less than a week before the shearing or crushing season, inform the inspector by post, or by notice delivered to his address, of the date of the intended commencement.

Copies of the above can be obtained from the Government Printer, Brisbane—Price, 6d.; posted, 7d.

PURCHASE OF STOCK AND PRODUCE FROM THE DEPARTMENT OF AGRICULTURE.

——:o:——

Purchasers of Stock and Produce, Plants, Seed, &c., from the State Farms and Agricultural College are reminded that Sales from these Institutions are made for Cash only. Persons desirous of making purchases should, therefore, first ascertain the cost of whatever articles they desire to obtain, and remit the full purchase-money when sendiug an order.

STATE FARM, WESTBROOK.

GRAPE CUTTINGS.

Over 50,000 for distribution, including 100 VARIETIES, at the following RATES:—

Wine Varieties, 15s. per 1,000; or 2s. per 100.

Table Varieties, 20s. per 1,000; or 3s. per 100.

Less quantities than 100, at the rate of 4s. per 100.

Collections of Small Quantities of each Variety made up at the rate of 4s. per 100.

If the selection be left to the Manager, only such available Varieties most Suitable to the District they are required for will be sent.

All prices f.o.b. Westbrook.

Application should be made direct to the MANAGER, State Farm, Westbrook, before 1st AUGUST, accompanied by a Remittance to cover Cost of Cuttings and Freight. Applicants should state where they wish to take delivery.

MAIZE AND PUMPKIN SEED.

STAR LEEMING MAIZE.

A Limited Quantity of Seed is now ready for distribution.

Price: Six Shillings per bushel, f.o.b., Westbrook.

The strain has been improved by careful selection, and the Seed is from the Centre of the Cobs only.

SILVER NUGGET PUMPKIN.

The Seed of this, the best of all Table Pumpkins, is also an excellent strain.

Price: Six Shillings per lb.

Both the above have been saved from isolated crops, no other varieties of maize or pumpkins being grown near them.

To expedite delivery, application should be made direct to the MANAGER, Westbrook State Farm, together with remittance to cover Cost of Seed and Freight.

HERMITAGE STATE FARM.

A number of FINE YOUNG TURKEY GOBBLERS are for SALE. For particulars, intending buyers are requested to communicate with the Manager, Hermitage State Farm.

COTTON SEED.

We have been requested to notify Cotton Planters that Messrs. J. Kitchen and Sons, Limited, are prepared to supply UPLAND COTTON SEED FREE for this year's planting, and that the firm will pay the railage on all Cotton consigned to them during this year and 1907. The railage which has been already charged to Cotton Suppliers will be refunded to those who have sent in supplies.

STATE NURSERY, KAMERUNGA, CAIRNS.

RUBBER, COCOA, KOLA-NUT, CAROB BEAN, KAPOCK, VANILLA, CARDAMON, AND OTHER VALUABLE TROPICAL ECONOMIC PLANTS FOR SALE.

The Instructor in Tropical Agriculture notifies that PLANTS of the above useful and valuable AUXILIARY PRODUCTS may be obtained by application to the Manager, Kamerunga State Nursery. PLANTS available at any time. SEEDS when in season, and which, BEING MOSTLY OF SHORT VITALITY, should be promptly applied for.

RAMBONG and PARA RUBBER, CARDAMON, and KAPOCK PLANTS, 1s. each, or 10s. per dozen; others, 6d. each, or 5s. per dozen; plus packing, railage, or postage.

ALL SEED, 6d. per packet.

Seed of CENTRAL AMERICAN RUBBER (*Castilloa elastica*) available November to January; and of PARA RUBBER (*Hevea braziliensis*) from February to April.

Lists of Tropical Economic Plants available may be obtained on application to the Manager, Kamerunga State Nursery, Cairns, North Queensland.

NOMINATED IMMIGRATION.

RESIDENTS OF QUEENSLAND

Desirous of Assisting their Friends or Relatives in the United Kingdom or other parts of Europe to EMIGRATE to Queensland, may procure full Information from any Clerk of Petty Sessions, or from the Immigration Agent, Brisbane.

By Authority: GEORGE ARTHUR VAUGHAN, Government Printer, William street, Brisbane.

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Edited by
A. J BOYD, F.R.G.S.Q

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THE

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ISSUED BY DIRECTION OF

The Hon. THE SECRETARY FOR AGRICULTURE

Edited by A. J. BOYD F.R.G.S.Q.

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SEPTEMBER.

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1906.

CONTENTS.

NOTICE.

Queensland Agricultural Journal.

It is hereby notified that the *Journal* will be supplied to all members of Agricultural and Horticultural Societies who do not derive their livelihood solely from the land, on payment, in advance, of an annual subscription of 5s., which will include postage. Schools of Arts will be supplied at the same rate.

Persons resident in Queensland whose main source of income is from Agricultural, Pastoral, or Horticultural pursuits, which fact should be stated on the attached Order Form, will receive the *Journal* free

ON PRE-PAYMENT OF 1s. PER ANNUM,

to cover postage.

To all other persons the annual subscription will be 10s., which will include postage.

All remittances should be made by postal notes or money orders, but where they are unobtainable stamps will be accepted, though the Department accepts no responsibility for any loss due to the latter mode of remitting.

For your convenience an Order Form is attached. A cross on each side of the Order Form indicates to the recipient that his subscription is again due.

Amount of one year's subscription should therefore be forwarded with Order Form, without delay, to the UNDER SECRETARY, Department of Agriculture and Stock, Brisbane.

All subscriptions received for the *Journal* after the seventh day of the month will commence with the month after that on which payment is received. Previous copies available will be supplied at 6d. per copy.

ORDER FORM.

To the Under Secretary, Department of Agriculture and Stock, Brisbane.

For the enclosed..please forward me THE QUEENSLAND AGRICULTURAL JOURNAL for One Year.*

Name..

PLEASE WRITE PLAINLY.

Address..

....

Occupation..

* State amount according to above rates.

[*Frontispiece.*

The National Association's Grounds at Bowen Park.
The Parade of Stock at the Exhibition of 1906.

The Queensland National Association's Exhibition, 1906.

The success which has followed the energetic work of the Council of the National Association in preparing for and carrying out the Exhibition at Bowen Park this year is gratifying not only to members of the association but to district exhibitors, manufacturers, and producers generally throughout the State. The value of the work of the association consists not merely in the amount of money taken at the gates, but in its effects in bringing together people from all parts of the Commonwealth, as well as many from oversea, thus advertising far and wide the great resources of this most resourceful of all the States of Australasia. The general public is not aware of the great volume of business transacted during and after the show, as a direct consequence of the advantages offered to business men, and to buyers and sellers generally, by personal inspection of the exhibits and personal communication with agents. Thus, as an advertising medium, irrespective of its value from an educative point of view, the National Show is of primary importance, and fulfils a purpose which would be impossible to attain in any other way. We leave a general description of the Exhibition to the enterprise of the metropolitan and country journals, confining ourselves to special salient points in connection with the grounds, the exhibits, and the management. With respect to the last item, much credit is due to the energy and exertions of the secretary, Mr. Charles Arvier, for the manner in which he carried out the onerous duties devolving on him, and we are pleased to learn that his efforts have been very gracefully recognised by exhibitors, particularly by the district exhibitors. The position of secretary to an important association such as this is one demanding much tact and firmness, at show time especially, when one has to remember the quotation so very appropriate to the occasion—"*Tot homines, quot sententiae,*" which, being interpreted, implies that where many are gathered together there will be as many different opinions.

The very attractive district exhibits deserve special mention, as of late years they have formed a distinctive feature of the Exhibition, and are especially valuable in educating the people in respect to the various products and industries of North, South, Central, Western Queensland, of the tablelands and the coast, and of the tropical, sub-tropical, and temperate districts of the State. Nor must we forget that a portion of Australia (which, we hold, should form part of the Southern District of Queensland) has also been represented amongst the district exhibits, although regrettably absent on this occasion. The Moreton exhibit has in the past been awarded first place amongst these important exhibits, but others, determined to wrest the laurels from the Southern men, have gradually crept up, until at last the Wide Bay and Burnett men have tied with the former. One more point, and the coveted first prize would have gone to the famous sugar and coal district of the South. How the ceratodi of the Burnett would have skipped in their muddy retreats had they heard the joyful sound, even as the sweet potatoes of Georgia started from the ground as the Southerners marched through that State! Rockhampton also made a brave show, and it was said that, had a trophy been sent from the Lake's Creek Meatworks, the Central District would have got a rung higher on the ladder. The arrangement of the Logan and West Moreton exhibits was also very fine, and they were deservedly awarded nearly as many points as the winners of the blue for "effective arrangement of exhibits." Next year we hope to see at least two districts of New South Wales competing for the honour of their State and for the desirable, generous prizes offered by the association.

The State Premier (the Hon. W. Kidston), in the course of his speech at the luncheon on the opening day, said *inter alia:*—"The thing that struck him about the annual exhibition was its truly national character. The district exhibits were an admirable feature of the show, and the competition was excellent from a national point of view. A personal patriotism was shown in the exhibit of articles for the sake of the district. It was an exceedingly healthy and profitable spirit to inculcate. . . . They needed to educate their own people in the possibilities of their own country, and if they could develop the district competition sufficiently they might be able not only to educate their own people but to get together products from all parts of Queensland which would be worth sending to the old country. He was certain that, if the display was really worthy of the industries and production of Queensland, it would not only open the eyes of many Queenslanders, but would open the eyes of the people in the old country as to the value and possibilities of Queensland." This was putting all we have said and written on the subject in a nutshell, tersely and to the point. The promise to offer a trophy of a cup or shield of considerable value on behalf of the Government, to be competed for annually in district exhibits, should act as an additional incentive, if any were wanted, to bring forward the best from all parts of Queensland and from the Northern Districts of New South Wales.

The Secretary for Agriculture, the Hon. D. F. Denham, also was very sympathetic with the association. It had, he said, done very much to further the interests of Queensland. If was per medium of large gatherings, such as they had on this occasion, that the agricultural interests were developed and the industrial interests promoted.

A word or two must be said about the association's grounds. The area is exceedingly limited, and if it is already being found too cramped, when Queensland's population numbers but 500,000 persons and only 600,000 acres are under cultivation, what would be the facilities for holding such a popular exhibition when the population and the area under cultivation are doubled? On this point, Mr. Denham explained that it was by their own desire that the association remained "cooped up" in this small ground. Whilst hoping that they would be able, after spending so much money on the new grandstand, to secure an adequate return, he felt quite sure that before long their present ground would become quite inadequate.

All things, however, come to those who know how to wait. There is plenty of room close to the present grounds; there is still more room on an admirable site farther away. Time and necessity will before long solve the difficulty, let us hope, to everybody's satisfaction and profit.

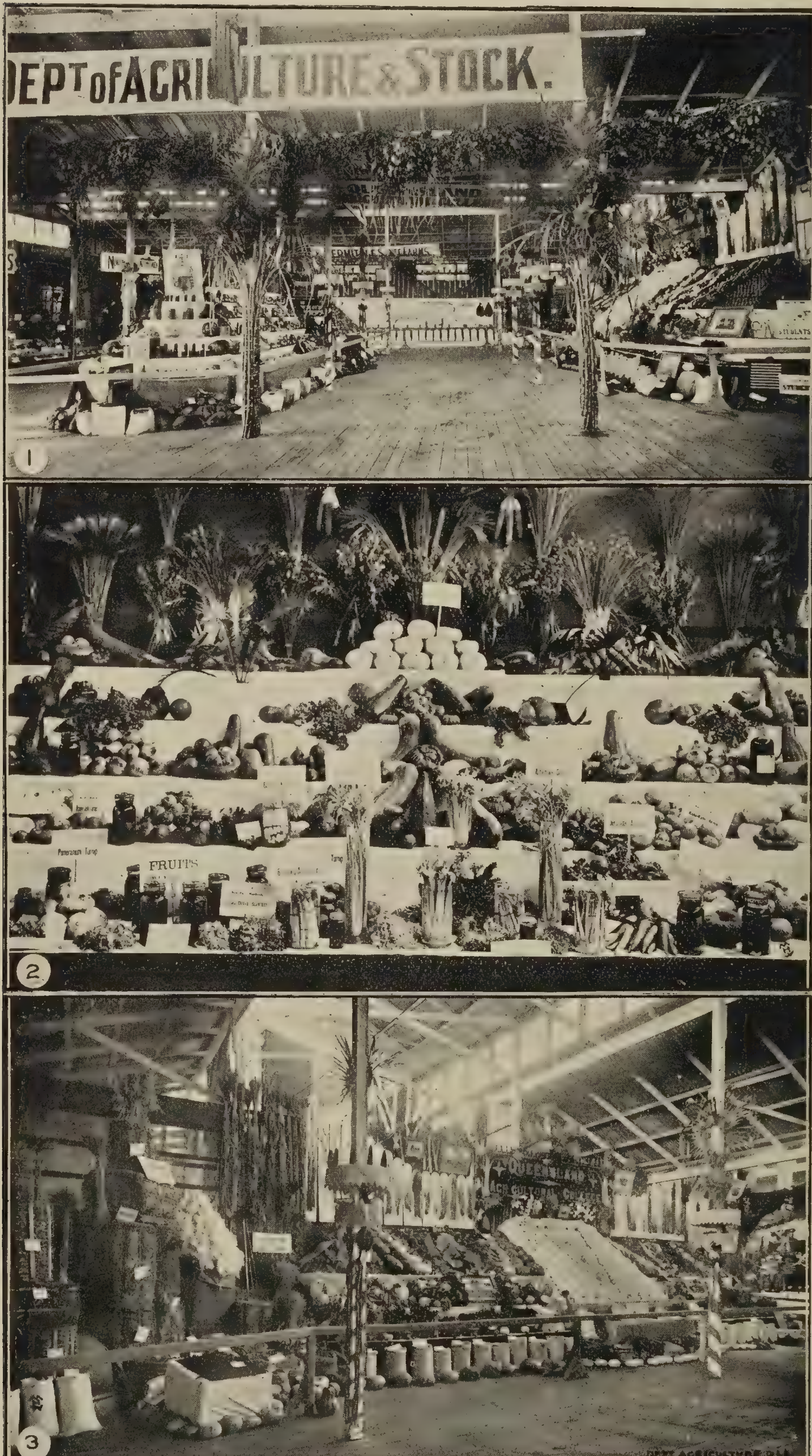
As usual, the State farms and the Gatton Agricultural College made what may be called a combined exhibit of all the natural productions of the tableland. There were splendid horticultural exhibits from the State farm at Westbrook, near Toowoomba; from the Hermitage State Farm, near Warwick; and from Biggenden, in the Burnett district. The Kamerunga State Nursery showed a trophy of Northern tropical fruits, and the Queensland Agricultural College had an excellent and well-arranged show of the articles produced at the College in the shape of dairy products, such as butter, cheese, bacon, &c., and numerous samples of field and market garden produce. In the Westbrook bay, the now well-known "silent lesson" on vine-pruning was conspicuously displayed so that "he who ran might read." There was one good feature about the arrangement of these courts. There was ample room to move about and examine the various objects which had been artistically arranged with the double view of effect and facility for observation.

The new departure, "Corn Cob Competition," was a very happy thought, and is calculated to incite even very young children to take up the pleasurable side of farming, which cannot but lead to a love for the oldest and, one might say, the noblest of the professions. It cannot be too earnestly impressed upon

Plate XIV.

The District Exhibits at Bowen Park.
1. Wide Bay and Burnett.
2. Moreton.

Plate XV.



The Bowen Park Exhibition, 1906.

1. General View of the State Farms and Agricultural College Exhibits.
2. The Westbrook and Hermitage State Farms.
3. The Queensland Agricultural College Exhibits.

our school children that the farmer rules the world. All the noblest achievements of war and peace, all the triumphs of chemical and engineering science, would be rendered impossible without the labour of the farmer. Annihilate the farmer, and the human race would dwindle to a few savage tribes of hunters and fishermen. When the victorious Roman armies subdued the Eastern, Western, and African nations, what was the chief need of those armies? Corn and forage. During the disastrous retreat of the Grand Army of Napoleon Bonaparte from Moscow, what was it that destroyed as many men as did the ice-king and the Russians? The want of corn. What supported the Japanese in the Korean and Manchurian campaign? Rice. It is well said, "An army marches on its belly," and it is due solely to the farmer that an army can take the field. Teach, therefore, the young to love and respect and enter into a profession which is the moving spirit of all other professions. This corn cob competition is a move in the right direction. With what pride must that little toddler of six years of age have found himself celebrated as the champion corn-grower of Queensland! Let us hope that he will by and by graduate at the Agricultural College, and eventually blossom out into a well-to-do farmer.

What shall we say about the arrangements for exhibiting stock in the ring? We have seen parades of stock in the old country, as well as in Sydney and Melbourne, and we are sure we shall be borne out in the statement that scarcely could the parades at Bowen Park be excelled anywhere at any event in Australasia. The favourable formation of the ground and the facilities for observation afforded by the old and new grandstands were such that a perfect view of the bewildering panorama of between 300 and 400 moving animals could be obtained by every one of the vast crowd of 45,000 visitors. The arrangements appeared to be as perfect as it was possible to make them, and on all sides nothing but praise was heard from both exhibitors and the public. The new grandstand is admirably situated to shield those occupying it from the westerly sun and wind. The seating accommodation is good, and the spacious dining-room in the basement can accommodate comfortably several hundred visitors. We regret that our space will not permit us to give a more extended notice of the various exhibits, but that has been ably done by the daily and weekly papers. We make up for our deficiency in this respect by several illustrations from photographs taken by Mr. H. W. Mobsby, artist to the Department of Agriculture and Stock.

PACKING CASTILLA SEEDS.

The same journal states that, on account of the thin seed coats, castilla seeds are very liable to injury if not packed with extreme care, and that the best method is to use pulverised charcoal which is slightly dampened. To secure a uniform moisture throughout the packing material, which is absolutely necessary, it is best to wet the charcoal powder thoroughly, and then dry it for a while in the sun or over a fire, stirring it now and then. For transportation, tin boxes are best, and in these the rubber seed and charcoal are packed in alternate layers. It is important that individual seeds should not touch, and that the whole mass is securely packed to prevent shaking. By this method of packing castilla seeds can be sent to any part of the world, and retain their germinating power for several months.

[The word "castilla" may not be a misprint, but we have always understood the spelling to be "castilloa."—Ed. "Q.A.J."]

Agriculture.

FARMING IN ARID DISTRICTS.

Plants are stimulated to growth by seasonable rainfall, by genial sunshine, by a plentiful natural supply of suitable plant food, and, failing these latter, by the application of manure, by artificial irrigation, and by diligent scientific cultivation. Is it possible, then, to raise payable crops on lands rarely visited by rainfall, and where the means of artificially supplying moisture are not available? This question has been satisfactorily solved in that country of continuous scientific agricultural experimentation, the United States of America. The arid districts of portions of the States have been conquered, and now produce crops which would formerly have been thought impossible of attainment. How has this been done? Merely by cultivation. But for a long time it was attempted to cultivate these dry lands in the ordinary method adopted in more favoured districts, and such a system proved absolutely valueless in such States as Kansas and Nebraska. In Queensland wheat-growing districts there is usually, except in times of drought, a seasonable and reasonable amount of rainfall, but when the early or the latter rains fail to visit the wheatfields there arise dismal forebodings of failure of the crop. Even as we write, these fears are being entertained by the Downs farmers for the crop to be harvested in the last months of the current year. As a rule, the wheat lands are ploughed but once to a depth of about 6 inches. Hence there is a very shallow depth for the retention of any cloud water which may fall, and a further disadvantage is that, the soil not being reduced to a fine tilth, its constituents are not exposed to the beneficent disintegrating influence of the air.

Now, "the absorption of nutritive matter by the soil is a phenomenon of universal occurrence and of widest significance as influencing the condition of plant growth." So writes Lucius M. Wilcox. "Its manifestation is among the most common processes of Nature; yet not till within the past half-century was it fully recognised or appreciated in its bearings on plant nutrition."

In this State, where irrigation is resorted to, the farmers and planters are inclined to depend too much upon irrigation and not nearly enough on cultivation. If the surface of the soil is kept perfectly pulverised, it is surprising what an amount of moisture it will retain in a dry time. By the cultivation the capillary tubes of the soil are broken up. It is through these tubes that the moisture in the subsoil rises to the surface and escapes. If these tubes can be closed, the result must be greater power of retention of moisture. The breaking up of the tubes is accomplished by finely pulverising the top soil. This loose soil acts as a mulch or blanket which prevents loss of moisture and protects against the direct rays of the sun. There are few farmers who do not know this; but how many are there who regularly put their knowledge into practice?

The first necessity is deep ploughing at the outset. The deeper we plough the more the mass of plant food is increased, and the greater the quantity of moisture stored from which the plants can draw the needed supply. Dr. Maxwell, in a lecture to farmers at Toowoomba some time ago, said, on the subject of deep ploughing: "Just as truly it increases the depth and space from which the crop can draw its water. It is true that some moisture can rise up to the roots, even where the roots cannot go down to the moisture. This upward movement of subsoil moisture is too slow, however, to meet the needs of the crop, and particularly when great heat waves are blowing over the land. As a result, the crop wilts, and, in severe cases, is ruined in a few days. Moreover, when the subsoil moisture does rise to the upper 6 inches of surface soil, it is picked up by the sun and wind and lost to the crop. There

are two chief purposes to have in view in considering the natural water supply of the crop: First, the deep movement and tillage of the soil, in order to let the roots permeate and go down to a great depth, whence they can draw on a larger supply of moisture, and where they are protected from the high temperature that can prevail in the upper soil during waves of intense heat and wind. Second, the keeping of the upper 3 or 4 inches of soil in a loose state by surface cultivation, in order to prevent the escape of rising moisture."

This method of retaining moisture—namely, by constantly keeping the upper surface loosened—however practicable in the case of crops of sugar-cane, maize, &c., is not possible in the case of other cereal crops such as wheat, barley, oats, &c. Here some different system must be adopted, and we find that system well explained in the subjoined paper on "Dry Farming," read by the Hon. T. Pascoe, M.L.C., before the Whyte-Yarcowie branch of the Agricultural Bureau of South Australia on 16th June. The paper, which we take from the "Journal of Agriculture of South Australia," is by Professor Campbell:—

PROFESSOR CAMPBELL'S SYSTEM OF SOIL CULTURE.

Last January an article appeared in "The Register," which contained a report by Mr. McColl, M.P., of Victoria, to the Minister of Agriculture for that State on the subject of dry farming in America. The subject interested me, but the report was so meagre that I could not understand the system. While in Melbourne recently I made inquiries from the Minister of Agriculture (Mr. Swinburne), who sent me to Dr. Cherry, the Director of Agriculture for Victoria, who had sent to America for some copies of Professor Campbell's Manual to study himself. One of these he kindly lent to me, from which I think I have been able to learn the main features of his system, and bring them under the notice of members of this branch of the Agricultural Bureau.

The theory is that, by conserving the moisture in the soil by a proper system of cultivation, land in comparatively dry country can be made to produce four times as much; or, to use the professor's own words, "if farmers would only grasp the principles involved in properly handling the soil and its relation to the plant, including the part that water, air, heat, and light play separately and collectively in the growth and development of all plants; also how these elements are regulated by the physical condition of the soil, and the methods by which this proper physical condition may be secured and retained through a simple system of cultivation."

A difficulty presents itself to the reader of the manual at first in the great difference of methods which obtain in America and South Australia—not that the methods by the general farmer there are any better or more scientific than here. Difference of climate must make some difference in system, although the parallel of latitude of some of the places mentioned by the professor is only about 5 degrees farther from the equator than we are. Yet the altitude makes a difference in the temperature, and hence he is dealing with country that is frozen in the winter time. The dry belt in America is that part immediately east of the Rocky Mountains, and he speaks of instances of seven months without rain. The leading idea of his theory is that it is possible to so cultivate the land that most of the rain that falls can be conserved for use of the crops. Even the summer rain can be saved so as to assure a harvest. Some of his statements are well known to be true, and have been proved by all of us in our own experience. We all know that finely pulverised soil absorbs more moisture and conserves it better and longer than lumpy or cloddy soil. Water is held in the soil in a kind of film or covering around each particle of soil, and the smaller the particles or grains of soil the greater the holding capacity. The following illustration is conclusive evidence of this, and is used by the professor:—Take 1 lb. of the coarsest buckshot and put into a glass; then take 1 lb. of the finest shot, and put into another glass. Put an equal quantity of water into each glass, and shake both so as to be sure that every shot is moistened all over. Then drain the surplus water off, and you

will find that the fine shot will retain about thirteen times more water than the coarse. Apply that illustration to fine and coarse soil, and one can soon understand fine soil absorbing more water than coarse. Fine soil not only absorbs more water, but it retains it longer than coarse; where the ground is left in a lumpy or cloddy condition, the vacant or air spaces in the soil are larger, hence evaporation is much more rapid. Then, again, a fine soil has this advantage over cloddy soil, in that it provides a better seed and root bed. The seed germinates quicker, and the roots have a better chance to grow, and so feed the plant itself. When we have pulled up a bunch of wheat we have noticed thousands of little feeders, fine as hairs, and we can easily understand how these can be not only restricted in their growth, but, what is more important, in their usefulness as feeders of the plant, when they have to encounter hard clods and vacant spaces. This accounts for what we have all probably noticed—that wheat often grows better and yields better on headlands, where the land has been worked finer and made firmer, than it does in other parts of the paddock. And we have also noticed under the old system of broadcasting that the quickest and best germination takes place in the wheat tracks of the cart that carried the sowing machine. Another advantage claimed for a fine, firm soil is that it requires less seed. Under this system they only use one-half bushel per acre. Another rule laid down by the professor is that the root bed must not only be fine, but firm. It has this advantage: Being pressed close to the subsoil, it forms a continuous avenue for the movement of moisture percolating more rapidly into the subsoil when the rain comes, and rising again by capillary attraction to feed the plant in dry spells when needed. This is, in short, the leading idea of the theory underlying the system.

Now we come to his methods, and the first thing to be noticed is this rule: Soil must never be worked dry or wet, or, rather, not too dry or too wet, both having a tendency to form clods, and hence spoil the water-holding capacity of the soil. The first implement to be used, and the one of the utmost importance, is the disc harrow. The rule is, so soon after rain as the soil is in a condition to work freely, double-disc it; that is done by lapping the disc one-half every time. Let the implement be as wide as you have strength to work it, because that ensures rapidity in the operations; disc around a piece of land the same way as you would plough it, then by lapping one-half of the width you have the discs going over it the second time, revolving at right angles to the ones that went over it the first time, thus ensuring a finer pulverisation, a more certain destruction of any weeds that may have started, and an even surface. If this is done well to a depth of from 2 to 3 inches, it assists in the percolation of moisture into the subsoil; when ploughed, it ensures a finer root bed; and, what is more important still, this 2 or 3 inches of fine soil on the surface acts as a mulch, keeping the moisture in, and so giving you a longer time in which you can plough.

Having thoroughly disced the land, the next operation is the ploughing, and when you start this you see the advantage of the previous operation—first, in that you will find the soil in such a condition that your plough is able better and with more regularity to reach a uniform depth. In turning the soil over, the fine soil on top is put down to the bottom to form the root bed. This, in ordinary ploughing, is where the clods go, thus leaving a loose space between each furrow, and spoiling at once that ideal root bed upon which so much stress is laid; the clods, old stubble, and weeds being mixed up together in the part of the furrow where it is turned over against the preceding furrow, leaving it rough, with spaces for air, making it almost impossible to properly pulverise or pack the soil, and bring it into a fit condition, to the best advantage, to feed the future crop. Of course, where the rainfall is sufficient, this evil is minimised by decomposition and soil dissolving and becoming firm by excess of moisture, but in a dry season this weakness in our system is estimated to take about one-third of our soil, and put it out of use for the coming

crop. The depth of ploughing recommended is from 6 to 8 inches deep, to be followed immediately by the subpacker, an implement new to Australia, which has the effect of firming and pulverising the under portion of the furrow, leaving the top loose and rough, to be fined by putting the harrows over it. Some may at once ask why not do this with the ordinary land-roller, and the answer is that you firm the wrong portion of your soil, and increase rather than decrease evaporation. Firming the surface does for a time increase the amount of water which may be held in the packed portion. The movement of water in the soil should be well understood, for it is of great importance in determining the quality and quantity of the soil from 2 inches to 54 inches below the surface, and the average proved that below 18 inches the unrolled land contained more water than the rolled, but above 18 inches the rolled land contained 1¼ per cent. more water than the unrolled. This shows that the roller packing the extreme surface draws the moisture to the packed portion, or the top, where the loss by evaporation is so great. But it is claimed for subpacking that it leaves the firm, fine stratum just at the point where the roots grow, and with the loose mulch on top we prevent the loss by evaporation.

The subpacker is an implement differing from the roller in this respect—that instead of being a drum or barrel of uniform thickness, and with a plain surface, it consists of a series of wheels with wedge-shaped tires about 3 inches apart. The effect is that, when this is put on the land after the plough, it has a lateral as well as a downward pressure, and so consolidates the whole of the under portion of the furrow. This operation is supposed to follow the plough every day. What is ploughed should be at once treated with the subpacker, thus preventing loss of moisture, and after the subpacker the harrows should be run over it before it has time to form into clods, and thus keep the fine, loose mulch on the top, and when this is done to land that is moist you have it in a condition to receive and retain moisture.

The professor lays great stress upon this: That we should try and secure the most uniform, fine condition of our soil for the threefold purposes—that it may contain more water, that moisture may move more rapidly through it, and that there may be a more prolific growth of roots.

In the foregoing I have tried to bring under your notice the main features of the theory, and put it into simple language that all can understand. I have not used the technical language of the professor that would have the effect of confusing. I have told you plainly his methods as they are given. I have confined myself principally to wheat; but the same system applies to the growing of lucerne and other plants of that character, and to orchards. Probably the objection has already occurred to your minds that this is an expensive method of dealing with agriculture, and yet, when you come to examine it, the extra is not so much. The discing and subpacking are the only extras, and these are not the most expensive or laborious operations. But, if the result is only a half or a third of what is claimed for it, it is cheaper per bushel than our present system; and if we can get the same return from 100 acres as we now get from 200 we are the gainers, having the other in use for grazing.

On the model farm established in Graham City, Kansas, the expenses of which are met by the Hon. James P. Pomeroy, to test and prove this system, the result has been that they have never in the four years reaped less than 40 bushels per acre, while it has been as high as 47; during the same period crops treated by the ordinary method were partial, and sometimes total, failures, their average being under 10. In another part the experiment was tried on a small scale by a farmer. One-half bushel per acre was sown on 8th, 9th, and 10th October, and, exactly four days after, the little spears could be seen from end to end of the drill line. In that time the moist earth had come in contact with, softened, and germinated the hard grain, the little

feeders had shot out, the air from above acting with the moisture below had drawn the shoot through from 2 to 3 inches of soil, and in seven days from sowing the plants measured from 3 to 4 inches high, and on 16th November, or a little over five weeks, it was thicker and higher than a crop sown on 17th September with $1\frac{1}{4}$ bushels of seed per acre. The next instance is a staggerer. On Kilpatrick Brothers' farm, in Nebraska, in 1903, this system was tried. It rained on 10th September, and by the 14th the field had been disced-ploughed, harrowed, and sown. The farm was on the rising ground facing the town of Champion, about $2\frac{1}{2}$ miles away. Four days after, the shape of the field could be seen from the town, owing to the green tinge on it. It did not rain again for seven months, and that was the only crop in the district that was harvested, and it averaged over 30 bushels per acre. These things may sound a little like America; but they are written by a professor whose reputation would certainly suffer if untrue, written to people who have the opportunity of refuting them, and the probabilities are, to my mind, that they are substantially correct.

Now, the question arises—How far can this system be applied to this country of ours, and how far are the conditions similar in the two places? To guide us in this, let me read the description of what is termed the "semi-arid belt" of America. The experience of people in this belt has been varied—years of partial and total failure, with occasional years of good crops. Alternate hope and despair have filled the settlers' minds. Had it not been for the cows and chickens, the small garden with the windmill as an irrigator, and the stock-raising industry, much of it would have been abandoned as an agricultural country. The old method of farming was tried, and was a disappointment. Various tools were tried as having merits for overcoming the drought. Summer fallowing was tried without any material change in the result. The rain-maker came with boastful confidence, and failed. Agricultural colleges were established, but conditions of climate and soil were so different and new that the professors had to study and experiment to ascertain what might be done, and how to do it, to overcome what appeared to be insurmountable difficulties. But when the storage of the natural rainfall began to be comprehended then came light and hope of the problem being solved.

One would almost think that the writer of the above was describing South Australia, or that portion of it immediately outside of Goyder's line of rainfall, so true is the picture to our experience. It is very seldom but that some time during the year we have rain sufficiently heavy to produce a crop; and if by a system of cultivation we can conserve this moisture in the soil for use to our growing crops, who can estimate what it will mean to South Australia, and the great area it will add to that portion of it that can be successfully occupied for agriculture? We have in these hundreds fringing on the rainfall line land equal in fertility, and capable of growing wheat equal in quality, to any in South Australia or the world. Time and again our crops have failed just for the want of a little extra moisture, and the want of that little extra moisture has made all the difference between a good crop and practically nothing. I am speaking now from bitter experience, and if we can conserve the water that falls, by this or a similar system, it will make all the difference between living in a state of chronic bankruptcy and comparative affluence. In our present system so much depends upon whether the amount of rain falls at the proper time, and every year the anxious times come in the shape of dry spells, when the plants stop growing and very often go back, so that when the desired rain falls it takes it so long to regain lost ground that the great benefit of the rain is lost. Now, if instead of this experience every year we know that, when we put in the crop even with a light rainfall, it will continue to grow and come to maturity, how much better will be the lot of the outside farmer? I am as conservative as most farmers, and I have studied this manual carefully, and I am bound to confess that it has a feasible ring about it. It is not only possible, but probable. At any rate, I think it is worth a trial.

THE MAELSTROM CORN COB GRINDER.

Mr. R. H. Gennys, Glen Innes Experimental Farm, contributes a useful note to "The Agricultural Gazette of New South Wales" of 2nd May last on the value of maize cores for pig-feeding. For years it has been customary in Queensland to utilise them as fuel or to burn them off with the maize husks. On this point, Mr. Gennys says:—

Many farmers do not appear to recognise that there is any value whatever in maize cores, and yet Mr. F. B. Guthrie, Chemist to the Department of Agriculture, has shown that nearly 50 per cent. is nutrient material, and when the cores and grain—that is, the whole cob—are ground up, the total nutrients reach 67 per cent. Experiments have shown, although the maize grain by itself contains 85 per cent. of nutrient, yet when fed alone it is too heavy and heating, and not easily digested; but when fed with the core added it makes a well-balanced and fattening ration. Mr. Guthrie further states that the meal has been profitably employed in pig-fattening. The addition of oilcake or molasses to material like corn-cob meal would be of advantage. The feeding of corn-cob meal, meal of grain and core crushed together, and maizemeal is given in the following table:—

—	Corn-cob Meal.	Mixture—Half Maize, Half Core.	Maize without Core.
Water	13·5	12·2	10·9
Ash	1·6	1·5	1·5
Fibre	35·3	18·7	2·1
Nutrient Matter—			
Albuminoids	4·5	7·5	10·5
Carbohydrates	44·5	57·	69·6
Fat and Oil	·6	·3	5·4
	...	100	100
Total Nutrients	49·6	67·5	85·5
Albuminoid Ratio	...	1 to 8	1 to 8

With respect to this matter, I have quite recently had an experience which proves the value of the above for pig-feeding, and this is not with cobs that have fully matured, but those which, owing to the shortness of the season here, did not ripen, but were partially shrivelled up and quite valueless and unsaleable unless crushed up. I had a quantity of this last year, and the question was whether it was advisable to leave the crop in the field and burn it or pull it and crush it up. Having the assent of my department, a "Maelstrom" or "corn-cob grinder" was purchased, also some store pigs. The price paid for eleven of these was £7. For a few days the cobs were thrown in to them with other material, but when the "Maelstrom" got to work they were fed almost solely on the meal of these shrivelled, wretched-looking maize cobs and water. The pigs devoured the meal—which was not ground very fine—readily, and in twenty-one weeks were sold for £22. Now, these maize cobs, if not used in this way, were absolutely waste products. We also fed our farm horses on this and chaff for some time. They were fairly hard at work during the period, and held their own well.

I have no doubt that this will prove a valuable food for milking cows, more especially if fed with molasses.

The cost of the "Maelstrom" or "corn-cob grinder" was £7 18s. 6d. The following statement will approximately show profits on eleven pigs fattened on

meal made from unmarketable corn cobs crushed up and fed with water only mixed with the meal:—

	£	s.	d.
Price paid for pigs	7	0	0
Labour of boy grinding, &c.	1	1	0
Harvesting cobs	2	2	0
Horse feed	0	6	0
	£10	9	0

Sold pigs for £22; profit, £11 11s.

In the July issue of the "Gazette," Mr. R. H. Gennys, in answer to several correspondents, supplies the following note on the value of maize cobs:—

The material used in the pig-feeding experiment consisted of half by weight of maize cobs with the immature grain on, and the other half was bare cores, from which all the grain had been stripped and sold at a good price. The pulling, husking, bagging, carting, and shelling of the latter (the cores), it is contended, are fairly chargeable against the grain taken therefrom. The labour of grinding amounted to as nearly as possible one guinea for the meal required. The amount mentioned for harvesting cobs includes also all the other expenses, such as feeding the pigs and mixing the material, the latter consisting of merely pouring on water and roughly stirring. The amount chargeable to the feeding and mixing is £1 4s. 5d., and I would like to state that this would be insufficient unless the feed-shed is handy to the yards, and the yards not too far away from the feeder's residence. I think these items, on the average, might be placed at 10s. more. The pigs, during the time they were being fattened, were kept in a large yard, the cost of feeding, cleaning, &c., being reduced to a minimum.

MOLES, BIRDS, AND TOADS.

A few years ago, at a conference of sugar-planters, the question of the destruction caused by the grubs was discussed. We suggested the importation of moles as the readiest and easiest way of ridding the sugar plantations of these destructive pests. Whilst some of those present thought well of the idea, others declared that the moles would tunnel through the cane roots, and so assist in the destruction of the stools. We stated our opinion that moles are not vegetable eaters, and that the construction of their jaws and paws was not adapted for boring holes through masses of tough, wiry roots. However, nothing more was heard about introducing moles. We recommend the objectors to read the following article on moles, birds, and toads, taken from the "Florida Agriculturist":—

"I saw in last week's 'Progressive Farmer' a recipe for killing moles. Now, the writer never kills moles, toads, or birds, but tries to make friends of them. Moles do not eat any vegetable matter, but are constantly tunnelling in quest of worms, slugs, and other insects that prey upon the roots of plants. To test this, the writer, some years ago, strung peanuts on thread, put the peanuts in the tunnel, and tied the threads to little stakes; the mole pushed them to one side three times without even biting one, and peanuts are delicious morsels to every animal, both biped and quadruped. The best crops you have is where the moles tunnel most. True, ground mice follow in the moles' wake, and sometimes destroy some of the crop, but not enough to justify the killing of the mole, for just as soon as the hot, dry weather comes, and the moles go deeper, you can see that crops where they have tunnelled start off as if by magic. I would like to get 1,000 good healthy moles to use on a farm I have recently purchased.

"Don't kill the birds. A friend of mine found some of his strawberries being bitten. Several birds were visitors of his strawberry bed. To save his berries he destroyed the birds, and the snails destroyed his berries.

"Toads, dirt-dobbers, and mosquito hawks catch and eat millions of injurious insects. Encourage them and save your crops.

"If moles become too numerous around your garden or potato bed, pour old salt or pickles in the track and drive them off for awhile."

A FINE CROP OF SWEET POTATOES.

The accompanying illustration shows the produce of one root of sweet potatoes on Mr. James Collins's orchard at Redland Bay. The tubers here depicted weighed 169 lb., weighing from 14 lb. to 12 lb. each. The weight of potatoes throughout the field averaged 100 lb. per plant. They were grown amongst the citrus fruit trees without manure or irrigation. This is the heaviest crop which has come to our knowledge since we recorded the extraordinary crop grown at the Penal Establishment at St. Helena, in 1897, when several acres returned 35 tons per acre. The produce of 12 acres, $155\frac{1}{2}$ tons, was sold at £4 15s. per ton, there being a great scarcity of English potatoes. This gave a return of £738 12s. 6d. Besides this, over 38 tons, worth £180 10s., were used on the island. Had the produce of the 6 acres alone been sold

at the highest price obtained at that time, £6 10s. per ton, the return would have been £1,365 for 210 tons. The largest potato turned the scale at 34 lb. Sweet potatoes have often been grown too often in succession on the same ground. This is unquestionably bad farming. The only soil in which sweet potatoes develop their best qualities and attain the largest size is sandy or volcanic soil, in which there is not an over-abundance of nitrogenous matter. The tuber does well after a cleanly cultivated corn crop. When sweet potatoes have been grown year after year on the same land, and the vines have been left to decay thereon, the soil is said to become "potato sick." In this case it is well to grow some other crop on the land for a time. Five hundred and fifty pounds per acre of a fertiliser—containing available phosphoric acid, 7 per cent.; potash, 9 per cent.; nitrogen, 4 per cent.—will give good results.

Dairying.

EFFECTS OF COLD WIND ON THE DEATH RATE OF FARM ANIMALS.

During the last two months very low temperatures have been recorded on the Darling Downs and other places on the tableland, and even near the coast and as far north as Bundaberg very severe frosts have occurred, although, of course, the mercury did not fall nearly as low at the latter place as on the more southern coast canefields. When to this very low temperature a bitterly cold westerly wind is added, it is easy to conceive that domestic animals such as dairy cattle and horses exposed without covering to the bitter blast must suffer considerably. The milk yield falls off, the cows are in danger of getting a fatal chill, and the owner is fortunate if he escapes with only a vet.'s bill to pay. The cost of a rug is not to be put in the balance with the loss of a valuable cow. Just read what an English vet. writes on this subject to the "London Agricultural Gazette":—

"The bitter winds which have prevailed for some days have told their tale in stable and farmyard. It is at the end of the winter, when the store of autumn fat which all animals are disposed to accumulate has been exhausted, that they become susceptible, and the bodily temperature is suddenly lowered and never recovered. During the past few days the young of all the domesticated animals, including poultry, have formed the subject of *post-mortem* examinations. So sudden is the illness, followed by collapse and death, that breeders' thoughts involuntarily turn to poison, and servants under notice are suspected, and enemies watched. The more successful poultrymen will have us to believe that 'machine-made' chickens are just as hardy as those reared under natural mothers, and claim to lose fewer than old-fashioned folks, but there is another possible explanation for their large success. They have not attained to the methods of accuracy required for such work without being in other respects more advanced in poultry management. They emulate the butter-maker in cleanliness, and the exhibitor in the selection of food stuffs. When every allowance has been made, it appears to me that incubator chickens have not as good average constitutions, but more sagacity than others. If a chicken or a boy is started early in the world to scratch for himself he will learn to be self-helpful sooner than others, but the parents in each case may make a wiser selection of food than the young can do by unassisted instinct. Some of the natural food discovered by the hen is very minute, but who shall say that the unaided chicken does find it, when abundance of easily-seen food is always before it, so much so that it frequently ferments, and this has been the cause of death in some of the specimens sent. The very young have no store of fat under the skin, and all animals, as previously stated, have used up their stores. Most horsemen are careful to give some sort of covering to a fresh clipped horse in the autumn, but it is at this end of the winter when they most want it. Feel the skin, and see how much you can pinch up between finger and thumb on a horse that was clipped late and has only coarse, stubbly hair until he again moults.

"There is still much misreading of Nature's operations in regard to skin coverings, and owners of animals who will say that exposure will make the coat grow better. Yes, it will in the autumn. If you want to turn out a blistered horse you will first deprive him of one rug, then another, then leave the window open, and next the door, and so accommodate him to the contemplated change. Nature will set about accumulating grease in the skin, and its glands will be less active and less open to the effects of the wind, but at this time of year there will be no growth of hair. The old stubble will be fixed, and the horse

so treated will be a month or six weeks later in getting his summer coat. If, on the other hand, you clothe him well in the stable, and give linseed and fat and heat forming foods, the old coat will come out and the new replace it in far less time. Before a horse or other animal can change his coat he must first do well inside. If he is hidebound, you may bustle him until he sinks with exhaustion without getting him to sweat, but once a horse is fat enough to sweat he will not be long in getting his new coat. Many carefully stabled horses at this time of year have made considerable progress in moulting, and then the owner's necessity or thoughtlessness causes them to stand in a bitter wind and check the functions of the opening glands. This may result in pleurisy or pneumonia in a few hours, and death or broken wind.

"Except in favoured situations, the impatience to turn out cows is paid for dearly in chills and loss of milk, if of nothing worse. One of the large dairies I attend is kept up to 70 degrees Fahrenheit during the winter, and often much higher. The owner calculates that the increased milk yield covers the additional risk, and for some time had the best of the argument, but fatal chills have followed this artificial state of things, and the loss of two or three £20 cows takes some time to recoup. Shelter, clothing, and heat-giving foods are most required when we have grown most tired of supplying them."

ANGORA GOATS.

If breeders of Angora goats in Queensland would follow the laudable examples of Mr. Missing, of Talegalla, Tiaro, Mrs. Donelly, of Red Hill, and the Yiddah Angora Goat Company, who were the only exhibitors of Angoras at the National Association's late exhibition, a very interesting feature would be added to the exhibits in the sheep pen. From the paucity of exhibits people are apt to infer that very little is done in the way of mohair-raising in this State. This, however, is an erroneous impression. There are considerable numbers of Angoras in different parts of Queensland, and the number is yearly being added to. We learn something of the early history of the introduction of these animals from the following "Courier" notes on the exhibits at the exhibition:—

"Breeders now see that if mohair-growing is to become a permanent and important industry they must grade up with the best of pure blood procurable, and that it will not be advanced by showing such lower-grade animals as formed the bulk of the exhibits at some of the previous Bowen Park shows. Most of those who have embarked in the business of mohair-growing have, as yet, to work up their flocks with pure-blooded bucks, and so eliminate all traces of their plebeian origin—the common goat. One interesting fact in connection with mohair-growing in Queensland is that our climate—as is the case with wool—has a most potent influence in softening and increasing the lustre of the mohair, and this has been illustrated in a remarkable manner by the fact that, at the great factory at Saltaire, the lower grades of Australian-grown mohair have commanded prices equal to second-class Turkish and South African mohair. It may be of interest to many now visiting the exhibition to learn what first gave an impetus to Angora farming in Queensland. Some years ago Mr. F. H. Shepherd, now stock inspector at Rockhampton, represented to Mr. P. R. Gordon, the Chief Inspector of Stock, that it would be well if the hordes of common goats along the Central line of railway, kept principally by the families of lengthsmen, could be graded up with Angora blood. That would afford the owners an acceptable, if small, annual income from the sale of the hair, and would at the same time provide a delicate meat supply. Mr. Gordon at once placed himself in communication with the representatives of Mr. Price, of South Australia, who made large importations of the pure goats from Turkestan, and also with the late Mr. Kempe, who kept

a pure flock in the centre of the Australian continent, at Lake Eyre. He also obtained much information on the subject from Angora-breeders in South Africa. But perhaps the greatest impetus was given to the new industry by Lieutenant-Colonel Spencer Browne, a valued and respected contributor to the 'Courier' and 'Queenslander,' who collected and epitomised a large amount of information on the subject, which was duly published in the abovenamed papers, and the information thus distributed broadcast over the State created quite an interest in the matter, and large numbers of 'nannies' of the common breed of goats were bought up at Rockhampton and other populous centres to form the nuclei of flocks in different districts. There had previously been in existence small flocks of grade Angoras, notably in the Springsure district, by Messrs. Wills, and on the North Coast line by Mr. Misken; but very few were aware that there were any of the breed in Queensland. The number of grade Angoras throughout Queensland is now very considerable, and mohair promises, in the near future, to become a not unimportant item in our annual exports. A very strong representation was made to the writer, on the grounds at Bowen Park, for some protection against the present law, which permits the shooting of goats when found outside their owners' possessions. This can easily be obviated by bringing Angoras within the provisions of the Diseases in Sheep Acts. The Angoras now on the grounds have been well and carefully judged; but, without calling in question the abilities and qualifications of the gentleman to whom this important work was allotted, it would appear that breeders should be strongly advised to improve the lustre, as the best of those at the show are still lacking in that most important quality. The judging has, however, been carefully carried out by the urbane gentleman who has acted in that capacity for years past. As usual, Mr. Missing is the chief prizetaker; but the Yiddah Angora Goat Company approaches pretty closely with a buck of any age. In does, Mr. Missing receives all the awards, although Mrs. Donelly, of Red Hill, was awarded a first prize without competition for a family group."

As encouragement to our Queensland breeders, we may quote Dr. Bailey, of California, the great authority on the Angora goat, who says that only a few years ago England introduced the Angora into the Cape country, and now South Africa produces as much mohair as Asia Minor. He says, however, that the consumption of mohair in this country last year exceeded 5,000,000 lb., of which the domestic herds furnished only 1,000,000 lb., American manufacturers having to compete with the British, German, and French for the rest. The consumption of mohair, he states, is increasing faster than the domestic supply, and the probabilities are, according to him, that it will take a long time for the American breeders to get enough goats to furnish their own mills with what they require.

MAKING CREAM CHEESE.

There are so many varieties of cream cheese, and curd cheeses described as cream, that the difficulty of selection is not inconsiderable. But we may, perhaps, take two or three types, simply pointing out that, although there is no empirical process, variations can be and are made in relation to each variety by those who possess the skill, and whose knowledge of principles enables them to control the work. The principle of making a Camembert, for example, applies to all makes of Camembert, and the same results are arrived at by different makers by the adoption of slightly varying methods of manipulation, but no unskilled maker can attempt variation at will, nor can a skilled maker depart from principles under any conditions. Pure cream cheese does not demand the same amount of study in its manufacture as a cheese which is not eaten until it is some age. A novice may produce, and often does produce,

very sweet butter from good cream without knowing anything of the principles involved, because immediately after churning all butter is sweet and palatable. But a novice cannot produce butter which develops such fine flavour within two or three days, and which will keep for a lengthy period. And in the same way the amateur with little experience may produce a very palatable cream cheese; although if the attempt were made to manufacture a variety which it became necessary to ripen, the results would be very different.

One of the simplest, oldest, and most successful methods of making cream cheese is to suspend thick cream in a cloth made for the purpose, which has been wrung out of pure water and is thus damp. The whey gradually leaves the cream; and if the cream after occasional examination is so manipulated that its consistence becomes the same throughout, it will be ready in a short time to be placed into the shapes or moulds. What we mean is that, if a volume of thick cream is hung to drain, the outsides will part with their whey or serum more quickly than the inside, which without careful manipulation will remain more or less thin, while the outside has become almost solid. Cream cheese shapes may be made in the form of a diamond, a *fleur de lis*, or a heart, or round, oblong, or square. They are best made of tinned iron, and, being practically little boxes without lids, the bottoms may be pierced with holes to form initials, which will be reproduced upon the cheese. To make cheese of given weight, the curd should be weighed as it is pressed within the shape, which has been lined with damp muslin cut to a convenient size, the ends of the muslin being folded over the curd; a tin-follower, just fitting the shape, is then laid upon it, together with a weight, just sufficient to express the remaining superfluous serum, and to make the cheese form. A little experience will soon show the maker when the cheese should be removed from the shape, but it does not follow that it is then fit for the table. It will be found that in almost all seasons, especially in very mild or cold weather, that a cream cheese, however carefully made, is not at its best until it has been kept a few days to develop its flavour. After it has reached its best, it more or less quickly goes off flavour. If some little attention is given to the subject, a maker will quickly ascertain whether cream cheese-making pays him or not. For instance, the cream used should be taken from a specified volume of milk, so many gallons or so many pounds. If recovered by the aid of the separator, it should be thick, and always taken of the same consistence and weight. When the cheeses have been produced and valued, a very slight calculation will enable the maker to ascertain how much a gallon he has realised for the original milk. To the value of the cheese, the value of the separated milk must be added in accordance with its particular destination, either for sale or for feeding calves or swine.—"Exchange."

PARALYSIS IN HIND LIMBS OF PIGS.

INVESTIGATIONS IN CAUSE AND TREATMENT.

One of the diseases of pigs which has been quite an annoyance, and has caused very heavy losses, usually manifests itself in mature animals, but very often in small pigs, by paralysis of the hind limbs, says Dr. Peters in "Wallace's Farmer." The animal at first shows a weakness by walking on its toes some days previous to the final collapse. It also shows symptoms of pain and restlessness by lying down and getting up again, moving around, and symptoms of rheumatic pains are noticed. In the later stages of the disease the hind legs become weak. The animal knuckles in the ankles and finally drags its hind parts. The limbs are cold to the touch, and the animal has no fever. Appetite is usually good. As the disease progresses the animal becomes weaker, and the constant dragging of the lumbar region (hind parts) causes abrasions,

as the animal will try in the early stages of the disease to move along with the other animals if possible. As stated above, the appetite does not seem to be impaired. The animals, however, do not as a rule make any rapid recovery. Very often when tonics are administered they finally get up on their feet again; but as a rule the animals seem to be weak and do not thrive well, and a recurrence of the disease may occur at any time. The disease usually appears in well-fed pigs. I have noticed that this disease attacks some of the best and fattest animals in the herd, either old animals or young shoats. I have found it occasionally in sows that had just farrowed and that were not in the very best of flesh.

The cause of this disease has been very largely attributed to the kidney worm. Whether it is due to this parasite or not I shall not definitely state, but the observations made by the department certainly contradict that theory, for we have held hundreds of *post-mortems* in the last six years on subjects affected with this disease, and yet we have failed to find in a single instance a kidney worm in animals so affected. On the contrary, I have known of instances in which animals manifesting no symptoms of disease whatever and apparently sound on their feet have been shipped to the packing-houses and their kidneys found very much diseased (degenerated—containing large cysts); and therefore I believe it cannot be the kidney worm that causes this trouble, for if it were the kidney or kidney worm we would certainly expect to see one or more kidneys partly destroyed, in advanced stages of the disease; and yet these animals during life showed no trouble of this kind. This has often been demonstrated by *post-mortems* on animals for other diseases, such as hog cholera, which revealed diseased kidneys, the owner never having noticed symptoms of this particular lameness. I think that the seat of the trouble is in the nerves of the spinal column, and we have therefore inaugurated the following treatment with very good success, judging from the reports received:—

OPERATION RECOMMENDED.

The operation we recommend is to produce active inflammation by using the actual cautery. To produce this cauterisation take some baling wire about 8 inches long, and taper this at one end. Cut about eight wires of this length; secure animal away from the buildings, and build a small fire; place the wires therein, and when they are at a white heat secure them with pinchers and insert them through the fat down to the lumbar muscle, making eight punctures on each side of the spinal column. Be sure to penetrate the fat so as to reach the muscle tissue. With this treatment we have been very successful. The reports of some 200 cases have been favourable, and we therefore venture to give our experience with this trouble, and advise anyone who has any cases of this kind to try this simple operation.

I wish to say that while it may seem barbarous to use the heated wire, yet it is not painful to the animals, as they do not seem to feel the white-heated wire inserted in the fat, and it is not nearly as painful as some of the treatments I have seen where a large incision is made in the back and turpentine or Spanish fly applied, causing a very severe blister and intense pain. The wounds caused by the remedy I recommend in this article heal readily, and in most cases leaves no scars whatever. The animal should be kept on light food, in a cool, shady place in the summer. It should be borne in mind that animals in this condition must not be subjected to a great deal of disturbance, which, causing excitement, is not beneficial to their recovery. Rest, with proper diet, is one of the essential features for this disease.

Poultry.

CAPONISING FOWLS.

A writer in the "Breeders' Gazette" gives some facts and figures about them.

A considerable amount of space has been wasted telling about the enormous size to which capons grow. As a rule, capons are not more than 1 lb. heavier than uncaponised cocks of the same age, provided they have been fed alike. Capons are caponised by using tools made for this purpose. These cost about 3 dollars (13s. 6d.) a set for the best makes, and can be got of any dealer in poultry supplies or almost any poultry publisher. The best time to caponise cockerels is when they are ten or twelve weeks old and from that time until four weeks older. Older birds frequently are caponised, but it is best to perform the operation at the earliest age.

Caponising is a very simple operation, and anyone with a steady hand can became an expert after a little practice. The operation is quickly performed, and the birds seem to feel very little pain, as they usually begin to eat at once after it is over.

Capons never become tough like uncaponised cocks, their flesh remaining tender and sweet like that of a spring chicken. The difference between the flesh of a capon and that of a cock is about the same as that between a steer and a bull. Capons are in good demand in all the large cities, usually at prices greatly in advance of those paid for ordinary fowls. Sometimes they bring two or three times as much as common fowls.

After a cockerel is caponised he has no ambition in life except to eat and sit around until it is time to eat again. Thus he becomes very fat, and puts on more weight than his uncaponised brother.

In preparing capons for market they should not be fed for twenty-four hours before being killed. Then they should be killed by sticking through the back of the mouth, and picked at once without scalding. The feathers of the neck, the stiff feathers in the wing, those on the lower part of the thigh, and the stiff tail feathers, are left on the carcass. Why this is done no one seems to know. It is just common custom, and has become the trade-mark of the capon.

Full directions how to perform the operation are always found in the box with every set of caponising tools. A rapid operator will caponise 200 birds in a day. I know one expert who caponises from 6,000 to 10,000 every year. Capons are more profitable than any other kind of poultry, as they cost no more to raise, and sell for so much higher prices.

REARING TURKEYS.

We often hear it said that turkeys are too delicate to rear successfully, and for this reason many poultry-raisers will have nothing to do with them. As a matter of fact, however, turkeys are no more difficult to raise than other fowls. To begin with, a good strain, such as the American bronze, should be procured to start with. Then, when the hens lay, the eggs should be gathered every day, leaving, of course, one for a nest egg, which should be marked to ensure its removal on the following day. Turkeys, like guinea fowls, will go a long distance from home to make a nest, and they require watching until they settle

down to the egg-laying business. When the eggs are collected they should not be put in a heap in a box or basket, but stood end on in chaff or bran, and turned every day. It is better to put the first eggs for hatching under hens than to allow the turkey hen to bring them out. When a turkey has laid ten or twelve eggs she becomes broody, and wants to sit. Then put her in a swinging coop, on a bare floor, and she will shortly begin laying again. This second batch of eggs she may be allowed to sit on. As to hatching in incubators, experience shows that it is not always successful unless one has hens ready to take charge of the chicks, as young turkeys do not take kindly to the artificial foster-mother.

Turkey eggs take from twenty-eight to thirty days to hatch out, and eight or nine are sufficient to place under a hen. When the young poults are out, they must not be exposed to the weather until they are quite dry. For the first two or three days feed them on hard-boiled eggs, finely chopped, to which may be added chopped lettuce or thistle leaves. Afterwards add a little oatmeal. Fed for a week in this manner they will quickly gain strength; the egg may then be decreased, but the supply of green food must be continued until they have passed the period when their juvenile ailments may occur. Not until this time may the food be increased in quantity and variety. When they are a fortnight old give them rolled oats, groats, and buckwheat, still keeping up the supply of green food chopped. It should be remembered that turkeys feed more after the fashion of a wild bird than of the domestic hen, and they will now begin to forage for green food themselves. They should, therefore, not be kept mewed up in stuffy houses under the false impression that they are too tender to run out. Keep them out in the open, the hen being retained in the coop for three or four weeks. Then a run should be made for them in front of the coop. If allowed to run free, they will usually wander so far that they cannot find their way back, and so become the prey of crows and hawks; and if caught in a rainstorm they have no idea of protecting themselves, and so perish. Keep them out of the wet entirely for about three weeks. After that, slight showers will not hurt them. Some people protect the poults from rain until the red begins to show on the neck, but that is quite unnecessary. In our warm climate rains are not much to be feared for them. At six or eight weeks old they may run at liberty with the hen, and all danger from their supposed delicate constitution is over.

CHEAP OSTRICH FEATHERS.

A correspondent in Los Angeles, California, tells us that Mr. Edwin Cawston, a multi-millionaire American ostrich farmer, is coming to England to start the American mail order business here. Following the method he adopted in California, his first step will be to rent suitable buildings, where he will have a collection of ostriches, and incredulous customers will be treated to feathers cut direct from the backs of the ostriches, manufactured under their eyes, and sold to them across the counter "at a price they never heard of." If our correspondent is correctly informed, there would appear to be lively times in store for the milliners and the South African merchants.—"Commercial Intelligence."

The Orchard.

CODLING MOTH NOTES.

By ALBERT H. BENSON, M.R.A.C.

Fortunately for Queensland, the codling moth, the great pest of the apple, pear, and quince gardens of the Southern States, has, up to the present, done comparatively little harm to the majority of orchards in this State.

Although it has been present for a number of years in the older orchards in and around the towns of Stanthorpe, Warwick, and Toowoomba, and many orchards only just across the New South Wales border have been badly infested to my knowledge ever since 1892, when I came to Australia, it has not spread as rapidly as might have been expected in the younger orchards of the Stanthorpe district.

It is, however, I am sorry to say, widely distributed, and few orchards are absolutely free from it; at the same time, it has not got such a hold that it cannot be kept in check or even stamped out by systematic and combined action on the part of all fruitgrowers in the affected districts.

That such action is efficacious has been amply proved in the case of Tasmania and South Australia, where this pest is kept in check to such an extent that the loss caused by it is now, in many instances, so small as to make no appreciable difference in the returns from the orchards. The secret of the success obtained in fighting this pest in Tasmania and South Australia is that the remedies have been systematically applied, and in the case of Tasmania this application has been compulsory.

In Queensland, I am strongly in favour of making the destruction of this insect compulsory, as, were our Diseases in Plants Act put into force and carefully administered with respect to this pest, I am certain that it would result in freeing a large number of our young orchards from this insect, and, further, that the damage caused by it would be reduced to such an extent that it would do very little harm.

The codling moth is an insect that can be fought successfully, but, to be fought successfully, it requires combined effort, and combined effort can only be secured by compulsion, as if the orchardist will not take steps to keep the pest in check for his own protection, then he must be made to keep it in check for the protection of his neighbours. In order to show the means by which this pest can be kept in check, I consider it necessary that every grower of pomaceous fruit should have a thorough knowledge of the life history of the codling moth, as it is useless to attempt remedial measures without knowing all about the insect to be treated. As some of my readers may not have this knowledge, I will give a brief outline of the life history of this insect. The perfect insect or adult moth is of a greyish-brown colour, about $\frac{3}{4}$-inch from tip to tip across the wings. The fore wings are marked with irregular transverse streaks of grey and brown, and a large rounded tawny patch at the extremity of each wing, near the inner angle, marked with minute streaks of bronze and gold, which extend both above and below. The hind wings are brown (Olliff).

After mating, the female moth lays its eggs either on the fruit or leaves, very frequently in the eye of the fruit. The egg hatches into the grub or larvæ, and it is in this condition that it injures the fruit. When fully grown, the larva is from $\frac{3}{5}$ to $\frac{3}{4}$ inch in length, and turns into the chrysalis or pupa stage when it is of a mahogany colour and about $\frac{1}{2}$-inch in length. The perfect insect emerges from the pupa.

During the winter, the insects remain in a semi-dormant larval state, the larva being inclosed in a silken cocoon. At the approach of spring and during spring, they change into the pupa state, and from this state into that of the perfect insect. The change from the larva to the pupa in spring does not take place at any given time, but is spread over several weeks, so that the perfect insects hatch out over quite a long period, thus necessitating not one

but several treatments for their destruction. When the larva has reached maturity in the fruit, in the majority of cases it leaves the fruit and finds a protected spot in which to spin its cocoon and turn into the pupa state. Crevices in the bark, old wounds in the tree, rough bark, stakes, or other material likely to provide a hiding place are all selected by the larva, and this shows us one method by which it may be kept in check—viz., by destroying all natural shelter and providing in its place an artificial shelter in which the insects will pupate, and in which they can be easily destroyed.

The systematic destruction of the pest should commence in winter, when the trees should be carefully examined; all rough bark should be scraped off; all cracks, crevices, or other likely hiding places on the tree should be scraped out, and all larva found therein destroyed. Houses that have been used to store fruit should receive careful attention, as it is more than likely that the crevices in the walls will contain numerous larvæ. Scalding out with boiling water and heavy sulphuring will destroy many, and those that escape this treatment can often be caught by placing mosquito netting over the windows or other openings. Rough slab sheds with more or less open roofs are a splendid breeding-ground for the moth, as they provide such fine shelter for the larvæ during winter, and fruit should on no account be stored in such buildings, as it is impossible to get at and destroy the insects without burning down the shed. All cases that have been used to store fruit in should be boiled; in brief, everything should be done to kill off every larva, so that there are none to hatch out during the spring and destroy the crop.

No matter how carefully the winter destruction is carried out, there is certain to be a percentage of larvæ missed, and these hatch out and lay their eggs as previously described, and the crop of larvæ resulting therefrom requires a totally different treatment. This consists of poisoning the food on which the young larvæ feed, and this is done by spraying the trees with an arsenical poison, full particulars of which are given later on. This spraying or, rather, sprayings kill a number of young larvæ, but a number escape, and these must be destroyed. This is done by gathering—picking off—all moth-infested fruit and destroying same, and by trapping the mature larvæ when they leave the fruit.

As previously stated, the mature larva when it leaves the fruit seeks for a hiding place in which to spin its cocoon and to pupate, and, if the winter work has been done carefully and there are no available hiding places left, then the insect will go into an artificial hiding place, which consists of a bandage or bandages placed round the trunk of the tree. These bandages may consist of strong papers, sacking, or other suitable material, firmly tied on to the tree in such a manner as to provide an efficient shelter. These bandages should be removed and examined at least once a week during the early summer; all larvæ found therein should be killed, and the bandage again put on. This first crop of larvæ soon turns into the pupa stage, and thence into the perfect insect, ready to lay more eggs, thus behaving in a totally different manner to the autumn crop, which remain in the larva state all through the winter, and even well on into the spring.

The second crop of moths that hatch out in early summer lay their eggs anywhere on the fruit, often where two fruits are touching, and they should be fought by spraying, gathering, and bandaging as already described.

The remedies for destroying the moth are, therefore, as follows:—

First.—The removal of all loose bark, and the thorough cleaning out of all cracks, crevices, stakes, old cases, fruit houses, or anywhere else that the pupa is hiding in during the winter.

Second.—The gathering and destruction of all moth-infested fruit whenever and wherever found.

Third.—Systematic spraying with arsenical poisons.

The first two of these remedies, if carried out properly and by everyone, will result in a decided decrease in the pest, and, combined with the third remedy, will practically wipe it out.

Plate XVI.

Trophy of North Queensland Fruits at the Bowen Park Exhibition, 1906.

The form of arsenical spray that is giving the most satisfaction in South Australia, and that is strongly recommended to me by Mr. George Quinn, of the South Australian Department of Agriculture, after many and severe tests, is what is known as Kedzie's mixture. It has the advantage of being cheap, and is of a uniform strength, which is more than can be said of the samples of Paris green that are offered for sale.

Kedzie's mixture is made as follows:—

Boil 1 lb. of white arsenic,
2 lb. of washing soda,
1 gallon of rain water
till the arsenic and soda are dissolved.

This is the stock solution, and to 1 pint of it add 40 gallons of water, into which the milk of lime from 6 to 8 lb. of newly slaked quicklime is strained. The fresh lime is most important, otherwise no combination takes place, and the wash burns the foliage and fruit.

Mr. Quinn informs me that he has also used the mixture as follows, with great success, viz.:—By pouring 1 pint of the stock solution into a bucketful of the strong milk of lime, and, after stirring it in, letting it stand for an hour before reducing to the 40 gallons, at which strength it is used.

Several sprayings are necessary in order to obtain good results. The first should take place as soon as the petals of the flowers fall. The second about ten days later. The third about a fortnight after the second, and the fourth and fifth at intervals of three weeks after that. A powerful spray pump, having a fine nozzle capable of distributing a fine mist-like spray, should be used, as it is extremely important that the spray should reach every part of the pest. Kedzie's mixture is a very efficacious remedy for all leaf-eating insects, and has largely superseded Paris green and other arsenical compounds for this purpose. The stock solution is very poisonous, and should be kept under lock and key, so as to prevent any possible accidents.

FRUIT FLY.

By A. H. BENSON.

In order to reduce the loss caused by this insect, all fruitgrowers are strongly advised to carry out the following simple precautionary measures:—

First.—To grow only such varieties of fruit trees as are worth growing, and to look after such trees thoroughly.

Second.—To grub out and burn all useless fruit trees that never give any return, and that only act as a nursery and distributing centre for the pest.

Third.—To gather and destroy all infested fruit.

The efficacy of these measures depends on the active co-operation of every fruitgrower—not only those who grow fruit for a living, but those who have one or more fruit trees growing in their garden, yard, paddock, or round their fences, as the neglect to destroy the pest whenever and wherever it is present will undo in a great measure the good that will result if the recommendations are carried out systematically.

There is only one stage in the life history of this insect in which it is possible to destroy it in large quantities, and that is when the larva or maggot is in the fruit. In this stage it is in a trap, as if the infested fruit is gathered and destroyed every larva contained therein is killed and subsequent crops of mature insects are prevented.

There is no known effectual means of preventing the fly from attacking the fruit other than covering the tree with a netting that is impervious to the fly, and this, in the case of anything except dwarf trees, is out of the question; so that our sole chance of keeping it in check is to reduce its breeding grounds, and to destroy the larva when in the fruit.

PROHIBITION OF QUEENSLAND FRUIT.

It will be remembered that at the monthly meeting of the executive of the Victorian Fruitgrowers' Central Council, held on 6th June last, the secretary reported that at a conference of delegates, representatives of the Victorian Fruitgrowers' Central and District Association, in conjunction with Mr. French, Government Entomologist, the following resolutions were adopted, and subsequently brought under the notice of the Minister for Agriculture by a deputation:—

1. Prohibit all fruits likely to introduce the fruit fly.
2. Prohibit bananas, oranges, lemons, pineapples, cucumbers, or
3. Prohibit all fruits unless accompanied by a certificate showing them to be grown in an orchard free from both the fruit fly or any other pest, and also that the fruit shall be inspected in a shed prepared for the purpose; that the fruit shall be examined thoroughly, case after case. No person other than Government officers to be allowed in the shed, and only clean fruit permitted exit. If 10 per cent. of infected fruit be found in a case, the whole package and contents to be destroyed. If 10 per cent. of the total number of cases in a line of consignment be found to be infected, the whole line of consignment to be destroyed.
4. Bananas to be prohibited unless imported in cases—the same restrictions as in resolution 3 will apply to bananas.
5. The restriction as to certificate of clean orchard shall not apply to cured fruits.
6. The cost of building, plant, extra inspectors, and destruction shall be met by charging a fee of 3d. per bushel case.
7. If any Victorian orchard be found to be fly-infested, the whole of the fruit of that particular variety must be destroyed; and no fruit of that variety allowed to be sent out of the orchard until a certificate has been given by the inspector that that orchard is free from fruit fly.

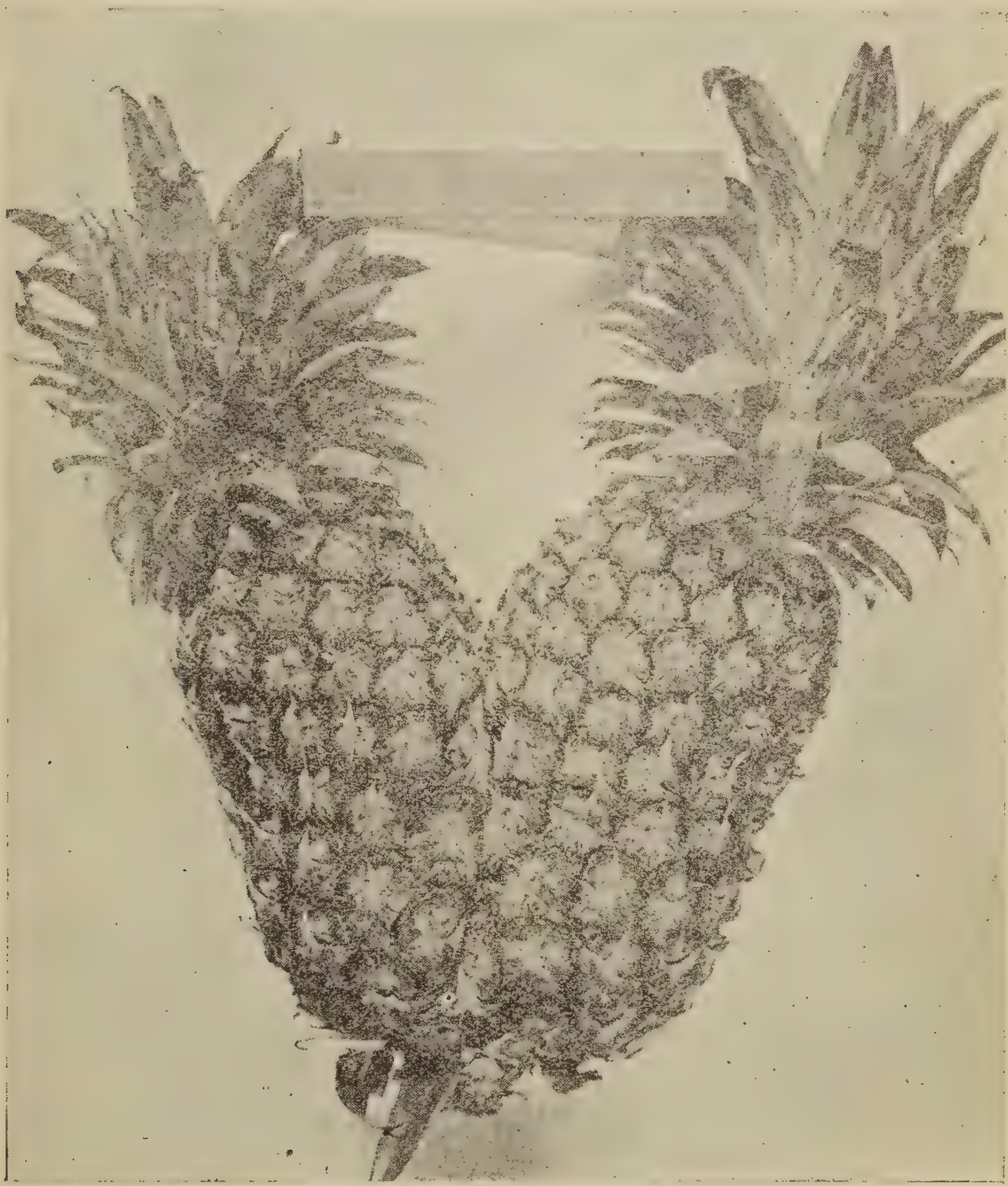
The Minister for Agriculture, in reply, remarked that the proposals, if carried into effect, might cause an upheaval of trade between the States concerned, but there was evidently necessity of some action being taken in the direction indicated. He would consider the matter, and inform them of his decision in due course.

It was decided by the meeting to again write to the Minister asking if action was being taken by his department to carry into effect the proposals brought under his notice for prohibiting the importation of all fruit from the Northern States likely to be infested with the fruit fly.

These drastic proposals have, we learn from the "Fruit World," been finally rejected by the Victorian Minister for Agriculture, Mr. Swinburne, who has decided that prohibition of the importation of fruit from the States infected by the fruit fly is impracticable, but he is taking steps to provide for more thorough inspection of fruit on arrival. Mr. Swinburne says he has given very careful consideration to all aspects of the question, and has come to the conclusion that prohibition of bananas and other fruit liable to be affected would be impossible. The Premier has, however, consented to provide funds for the erection of a fruit inspection shed close to the Harbour Trust offices, and the employment of a number of inspectors, who will make a detailed examination of fruits as they are landed from the other States, instead of the comparatively superficial inspection which takes place now.

REMARKABLE PINEAPPLE.

Pineapple-growers are accustomed to the extraordinary vagaries of pineapples in the way of misgrowth of the fruit. These are often met with extended fan-fashion instead of oval or pyramidal. Sometimes a growth of young pineapples appear in a semi-circle, each surmounted with a tuft of leaves. Others assume the appearance of an inverted bunch of carrots. Rarely, however, do they appear so symmetrically intergrown as in the



specimen of a smooth-leaved pine here illustrated, which was grown at Campsie, Ormiston, Cleveland. The weight of this specimen is 9½ lb. It was produced from a top planted in 1904, and has borne fruit for the first time this year. The equality in size of each of these Siamese twins is a characteristic rarely observed.

Apiculture.

HOW TO GET A FERTILE QUEEN.

A young fertile queen can be obtained through any experienced beekeeper in Brisbane, or the young beekeeper can raise one for himself. If you have a queenless colony unite it to one having a queen, for if you left it as it is till the time comes when you can get a queen one or more of the workers may in the meantime usurp the functions of the queen and commence to lay eggs. Such bees are called fertile workers, and are a great nuisance in a colony, as the eggs they lay only produce drones; and as a consequence the stock, unless provided with a queen, will die out. In the next place, it is rather a risky business to introduce a queen to a colony having one or more fertile workers. The easiest way to get rid of these pests is to unite the colony to a strong stock having a fertile queen. After a few days it can be divided and a fertile queen given, or a queen-cell, or brood and eggs, but in all cases these latter should be provided. Caging a fertile queen in a hive for two days will usually cause the destruction of fertile workers. Never allow a colony to remain queenless for any considerable time. Either requeen it or unite it to one having a queen, and then fertile workers will be unknown. When some drones are hatched out, young queens may be raised in any colony desired by removing the queen from it, provided there are combs containing young larvæ or eggs in the hive; eggs are preferable, as if only larvæ were in the hive they may get to be too old to raise a queen from by the time the bees had discovered the absence of the old queen that had been removed. If a queen could be raised from a larvæ more than three days old she may be considered a rather inferior one. All beekeepers prefer queens raised direct from the eggs, or at least from larvæ not more than one day old.

ROBBER BEES.

Although robbing is very prevalent in spring, before the honey flow sets in, it is never so difficult to prevent it at this season as in early autumn after the flow has ceased, or in the interim between the cessation of one description of honey-producing flower blossom and the commencement of another. Spring robbing is quite a mild affair as compared with autumn. Keeping the entrances of the hives contracted, according to the strength of the colonies, or their aptitude for protecting their hives, is generally a sufficient precaution against spring robbing. In autumn the diluted carbolic acid remedy, or some equally effective one, will have to be applied. If all colonies are strong and no queenless stocks are in the apiary, any serious case of robbing will be unknown. Italian or Ligurian bees have a greater aptitude for protecting their hives than any of the other varieties we have experience of; therefore very little trouble need be taken with Italians, for if the colonies are even fairly strong they will usually look after their own interests. It will, however, be to the beekeeper's advantage to keep a sharp lookout for some time yet, for while there is a dearth of blossoms of honey-producing plants nectar cannot be obtained, and an exceedingly strong desire seems to possess every bee to obtain it or some substitute in any possible manner. When a determined case of robbing takes place, it is usually through the fault or accident of the beekeeper. Perhaps a hive is carelessly left uncovered, some

honey or scraps of honeycomb laid about, or syrup spilt on the outside of the hives or near them. Either of these things would start the mischief, and on it goes till checked or put down. A determined case of robbing in an apiary of any size is not soon forgotten by the beekeeper who has experienced it. The air is alive with bees dashing about in all directions with angry hiss. Around the entrances of the hives the condition of things is worse—fighting, stinging, and struggling taking place, as if their very existence depended upon the amount of damage they could do in a given time. The killed are cast down to the ground in hundreds, whilst all around the combatants are struggling in each other's grip. Before robbing has grown to such an extent the fact is generally found out by the beekeeper, and is then very easily stopped. But, as "prevention is better than cure," take the precautions we have advised, keep all colonies strong and the entrances contracted, and then there is not very much danger of a serious case occurring in spring. It will be sufficient to contract the entrances of strong colonies to about an inch; in the case of weak stocks or nuclei, the entrances must be kept contracted to about a 2-bee space width—say, ¼-inch. We have often seen a tuft of grass laid against the entrance of an attacked hive baffle the marauders, as in attempting to gain an entrance the besieged can tackle them simply in the labyrinth of the grass blades. Carbolic smeared or sprinkled on the alighting board and around the entrance is generally effective in a spring attack. But in autumn, when it sometimes happens that none of these will stop the strife, a carbolised sheet thrown completely over the attacked colony, and left on until just before nightfall, will usually overcome the attentions of the besiegers.

GROWING TANIAS.

E. O. Dailey, in the "Mexican Investor," writes:—

Many people do not know what tanias are, and for their information I will say that they are a vegetable much grown in Jamaica, and an excellent substitute for potatoes. In tropical Mexico they are little known, but the writer has successfully grown them in several places in the hot country where potatoes will not grow. As potatoes form such a staple article of food with so many of us, their absence is always keenly felt. The cultivation of tanias will, therefore, prove almost a necessity with tropical planters when their use and mode of cultivation is once known.

The plant producing tanias is a handsome one, having large leaves on a long stalk. The tubers, in good ground, grow to 4 or 5 inches in diameter, and contain a large percentage of starch. They also contain an acrid substance, objectionable it is true, but which is gotten rid of by boiling them. They then prove almost equal to potatoes in flavour, and serve the same purpose on the tropical bill of fare.

A sandy loam soil is best. They bear heavily in a damp climate. They are propagated in the same way as yams. When the crop is taken up the head of the main tuber is cut off, leaving about 4 inches of stalk. These are then planted in rows 3 feet apart, the land having been well dug up beforehand. They can be planted at any time except in very dry weather, and are ready for use in from nine to ten months.

The young leaves can also be boiled and used as spinach. The tubers can be left in the ground a long time after they are ripe, and dug up as required. They are very heavy bearers, averaging a half-bushel of tubers per plant, so that a few plants will supply a house. They should be raised by everyone having a vegetable garden in the tropics.

Botany.

CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

By F. MANSON BAILEY, F.L.S., Colonial Botanist.

Order LEGUMINOSÆ.

VIGNA, Savi.

V. vexillata, *Benth.*; **var. Youngiana.** This principally differs from other forms or varieties in its lanceolate leaflets; from its hairy covering one might suppose it the species named by Sir W. J. Hooker—**V. hirta,** which plant, however, has very differently shaped leaflets. This Queensland plant in habit resembles the several other forms met with in the State; but its leaflets are lanceolate, almost 3-nerved at the base, 2 to nearly 3½ in. long, 1¼ in. wide at the broadest part; and the nerves and veins on both faces bear somewhat appressed, rigid, bristle-like hairs. The flowers are large, bluish-purple, similar to the other forms so common on our pasture lands.

Hab.: Sandy country near the sea, Percy Islands, *Tryon and Young Expd.*, Dec., 1905; Jan., 1906.

LONCHOCARPUS, H. B. and K.

L. nesiotes, *Bail. sp. nov.* A large rambling shrub, more or less rusty pubescent in all parts, branchlets, striate, lenticels rather large. Leaves imparipinnate, about 6 in. long; leaflets 5 to 7, cordate-ovate, the largest 2 to 3 in. long and 2 in. broad, shortly acuminate; petiolules 2 to 3 lines long, stipellæ setaceous. *Leaflets on young growth* 9, *lanceolate*, 1½ *in. long*, 6 *to* 8 *lines broad*, *tomentose*, *stipules prominent*, *cordate-elongate*, *closely clasping the stem and base of petiole*, *very hairy*. Flowers a rich glossy purple, in large spreading panicles, the long racemose branches 4 to 5 in. long, the short branchlets bearing usually 2 or 3 shortly pedicellate flowers. In the early inflorescence the flower buds are covered by cordate brown bracts, bordered with silky-white hairs, usually very caducous, but sometimes seen on the matured panicle. Pedicels 1 to 3 lines long, slender. Calyx 2 lines long, teeth acute. Standard orbicular 3 lines diam., slightly emarginate, hairy on the back, claw 1½ lines long and rather broad. Wings narrow, rather short. Keel long as the standard, obliquely-ovate, clawed. Staminal sheath glabrous, rather short, free portion of filaments hairy. Ovary densely hairy with light-brown hairs. Style with longish curly hairs along the inner edge, obliquely inflexed in the upper portion. *Nearly matured pods* 1½ *to* 2½ *in. long*, *and* 6 *to* 8 *lines broad*, *very pale coloured*, *marked by undulate-reticulate veins*, *bearing border-wings about* 1 *line broad*. *Seeds* 1 *or* 2, *flat reniform.* The pods closely resemble those of *L. Neuroscapha*, Benth., a Brazilian species.

Hab.: Middle Percy Islands, *Tryon and Young Expd.*, Dec., 1905; Jan., 1906. Bloomfield River, *Rev. W. Poland*, Nov., 1902. The italics refer to these specimens.

ACACIA, Willd.

A. subternata, *F. v. M.*; Benth. Fl. Austr. ii. 343. A medium-sized shrub with sulcate branchlets, viscid when young. Phyllodia almost verticillate, in clusters of 2, 3, 4, or more, linear-terete or very slightly compressed, with short recurved or hooked points, 3 to 6 lines long, without prominent nerves and scarcely furrowed. Stipules minute or none. Peduncles scarcely longer than the phyllodia, bearing each a globular head of numerous flowers, mostly 5-merous. Sepals rather rigid, linear-spathulate, fully half as long as the corolla, united in a 5-nerved cup at the base. Petals slightly striate, united to the middle. Peduncles bearing pods often more than twice the length of the phyllodia. Pod flat, very viscid, margins thickened, narrowed into a rather long stipes. Seeds oblong, obliquely transverse; funicle straight, gradually thickened from the base to the end.

Hab.: Newcastle Range, *A. H. Blackman*, July, 1906. This plant seems to differ from the typical form in the pods not being rigidly coriaceous or very obliquely striate, as stated by Mr. Bentham l.c.; but there is little other difference.

Chemistry.

ELEMENTARY LESSONS ON THE CHEMISTRY OF THE FARM, DAIRY, AND HOUSEHOLD.

By J. C. BRUNNICH, Agricultural Chemist.

FOURTEENTH LESSON.

CARBOHYDRATES CONTINUED: SUGARS, GLUCOSES, SACCHAROSES. FATS AND OILS.

Sugars are carbohydrates, which are soluble in water, and possess a more or less sweet taste. They are found very widely distributed in plant life, and in fairly large quantities in sugar-cane, sorghum, maize, sugar beets, sugar maple, and in most fruits. Some of the sugars are directly fermentable; others may only be fermented indirectly; and others, again, cannot be decomposed by fermentation at all.

We have already learned in the previous lesson that the first class of sugars are the **glucoses**, also called in accordance with their composition: $C_6H_{12}O_6$, *hexoses* or *monoses*. These sugars are either found in a free state in the cell sap of many plants and in most ripe fruits, and also in forms of combination with various organic acid as **glucosides**. This class of sugars may be obtained by the *hydrolysis* of other carbohydrates from the amyloses, and also from saccharoses. This process of hydrolysis, which has already been repeatedly mentioned, consists in a splitting up of the more complex carbohydrate molecules and forming simpler compounds, at the same time taking up water. This process may be caused by fermentation, and also by heating with dilute acids.

Dextrose, grape sugar, or **glucose,** $C_6H_{12}O_6$ or $CH_2O-[CHOH]_4-CHO$, is found mixed with other sugars, chiefly levulose or fructose, and with saccharose or cane sugar, in many fruits. Grapes are particularly rich in grape sugar; again, *honey* is a mixture of about equal parts of dextrose and levulose, dextrose forming the granular or crystalline portion and levulose the liquid portion of honey.

Dextrose is produced on a large scale from starch, by boiling it with dilute acids (see *Experiment 93* of Thirteenth Lesson), and is manufactured either in form of white crystalline powder—*starch sugar*—or in the form of a syrup—*glucose, starch syrup*—which always contains some other carbohydrates. Grape sugar is directly fermentable by the activity of yeast cells, splitting up into alcohol and carbonic acid gas. When heated, dextrose decomposes.

Levulose, fructose, or *fruit sugar*, $C_6H_{12}O_6$ or $CH_2OH-[CHOH]_3-CO-CH_2OH$, is found associated with dextrose and other sugars in fruits, in honey, and also in molasses. By the inversion of cane sugar a mixture of equal parts of dextrose and levulose, called **invert sugar**, is produced:

$$\underset{\text{Cane sugar.}}{C_{12}H_{22}O_{11}} + H_2O \left\{ \begin{array}{c} \text{under action of yeast} \\ \text{cells, or boiling acids} \end{array} \right\} = \underbrace{\underset{\text{Dextrose}}{C_6H_{12}O_6} + \underset{\text{Levulose}}{C_6H_{12}O_6}}_{\text{Invert sugar.}}$$

Both levulose and dextrose reduce Fehling's copper solution, and may be determined by this test.

In plant life these sugars are intermediate products, formed by the hydrolysis of starch and of cane sugar. These latter carbohydrates, formed in the cells of leaves, are continually changed into the more soluble forms of invert sugar, and transported to the various parts of the plants, where again further changes take place, as they are either used up in the production of fresh cell tissue or are stored up in the form of starch, cane sugar, and other carbohydrates as reserve foods.

Saccharoses or **bioses**, the second class of sugars, are formed from 2 molecules of hexoses, by a building-up process the reverse of hydrolysis.

Saccharose, sucrose, or **cane sugar,** $C_{12}H_{22}O_{11}$, is the most important member of this group, and is manufactured on a very large scale from the juices of sugar cane, sugar beet, and also from sorghum and sugar maple.

Cane sugar forms flat transparent crystals, which, when heated, melt at about 160° C.; on further heating, form a brown uncrystallisable mass, called **caramel,** or *sugar colour,* largely used for the colouring of sweetmeats, liqueurs, vinegar, rum, &c. When still further heated, a complete decomposition with the formation of acrid gaseous products takes place, leaving a residue of charcoal. When cane sugar is heated for a long time in watery solution, when boiled for a few minutes with very dilute mineral acids, or, again, when exposed to the action of yeast cells, an inversion of the sugar takes place. A cane-sugar solution does not act on Fehling's solution, but, by adding a few drops of hydrochloric acid to a solution of cane sugar and boiling for a short time, on again testing with Fehling's solution the formation of invert sugar is at once shown by a heavy precipitate of red cuprous oxide, Cu_2O (*Experiment 96*). All sugars and carbohydrates found in the plants are originally produced in the leaves by the process of *assimilation* or *carbonfixation* already alluded to. The small amount of carbonic acid in the air, averaging only about 3 parts of CO_2 in 10,000 volumes of air, is the basis of all organic compounds found in plant life. The air enters into the leaves through the minute openings, called **stomata,** and within the cells of the leaves, with the help of sunlight, and the minute grains of green colouring matter, called **chlorophyll,** an absorption of the carbonic acid gas takes place, under production of carbohydrates, and giving off free oxygen at the same time—

$$xCO_2 + yH_2O = C_xH_{2y}O_y \div 2xO.$$

Carbonic acid + Water = Carbohydrates + Free oxygen.

Messrs. Brown and Morrison, in their classical researches on assimilation of plants, published about thirteen years ago, have shown that cane sugar is actually the first carbohydrate produced by carbonfixation, and that as soon as the cell sap contains a certain amount of such sugar in solution starch grains are formed as the first visible product of such assimilation. The cane sugar formed is changed continually into invert sugar, under the action of a peculiar organic ferment, called *invertase,* which is always present in the young leaves of plants. Starch grains, again, are changed into maltose and dextrose by the action of the ferment *diastase,* and these carbohydrates produced are transported from cell to cell, through the cell walls themselves, by a process called *osmosis,* from leave-stalks to the stem of plants, from there to the buds and other growing points, to help in the production of new tissue; or they are again transformed and deposited in stems, roots, fruits, and seeds as reserve foods.

If we examine a stalk of sugar cane cut straight across, we will notice that the outer part is in form of a circular layer of rind, and that the interior consists of soft cell tissues, called **parenchyma,** dotted all over with numerous **fibro-vascular** bundles, which run through the stalk in longitudinal direction, cross each other at the knots of the cane stalks, and end in the leaves and buds. The soft parenchymous cells contain most of the sugar in solution in the cell sap; whereas the fibrous bundles, formed of thick-walled, long vessels, contain less sugar but more of other organic substances in their sap. In the youngest portion of the stalk—the "green top"—the sap will always contain less sucrose and more glucose and other impurities, and for this reason the top of the sugar cane has to be cut off, as it is not fit for manufacture of sugars. The green top also contains a particularly high amount of "invertase," which would lead to a rapid destruction of cane sugar in the rest of the stalk if the top was left on and any delay would occur between cutting and crushing of cane. The amount of sugar in the cane increases as the cane ripens, the amount of glucose at the same time decreasing. When cane becomes overripe, or when left lying too

long after being cut—again, under the influence of frost and diseases, and particularly when cane is damaged by fire—the cane sugar is, according to the climate, more or less rapidly changed into invert sugar, and the cane becomes less valuable, and in time perhaps quite unfit for manufacture, as nobody can imitate the process of Nature and change invert sugar back again into cane sugar.

A ripe sugar cane consists in an average of the following substances:—

Water, from	70 to 77 per cent.
Saccharose, from	12 to 20 ,,
Glucose, from	·2 to 1 ,,
Fibre, from	10 to 12 ,,
Various organic compounds	·5 to 1 ,,
Ash	·5 to ·9 ,,

The ash consists again of about one-third of silica, one-quarter of potash, and small amounts of phosphoric acid, sulphuric acid, chlorine, lime, magnesia, soda, and iron oxide.

In the process of **manufacture of sugar** from cane, the juice is expressed by passing the cane between heavy rollers, and it will be easily understood that very heavy pressure will yield a large quantity of juice of lesser purity than a lighter pressure, which yields less but purer juice.

The juice obtained contains more or less impurities, which are partially removed by a process of *clarification* or *defecation*—by *tempering* the juice with milk of lime, adding just a sufficient quantity that the juice has a neutral or slightly alkaline reaction. The limed juice is heated to boiling in the *clarifiers*; some of the impurities are coagulated by the heating, others again combine with the lime, and as the result of this clarification a heavy scum rises to the top, which is removed by skimming; and the other impurities are in the state of a flocculent precipitate, which easily settles down when the juice is run off into the *subsiders*. From the scum and sediment pure juice is obtained by a process of filtration by passing through cloth in the *filter presses*.

In a more modern and more perfect system of clarification, called *carbonatation*, a surplus of lime is added to the juice, which is then heated to a lower temperature and the surplus of lime removed with carbonic acid gas. The lime removes all the albuminous matters and gums, resulting in a clearer, brighter, easily filtered, and more workable juice than the ordinary process of defecation which is in common use in Queensland. The clear subsided juice has to be concentrated by evaporation. In order to avoid inversions, which would take place if heated for any length of time to the boiling point of water, this evaporation is carried out under diminished pressure, which lowers the boiling point, in special apparatus called *triple effets*. A triple effet consists of a series of a sort of boilers in connection with each other, in which only the first vessel is heated by direct low-pressure steam; the steam produced from the boiling sugar juice in the first vessel heats up the more concentrated juice in the second vessel; and the steam produced in the second vessel heats again the most concentrated juice in the third vessel, in which a high vacuum is produced by being connected to a vacuum pump and by condensing all vapours with cold water. The juice runs continually from one vessel to the other, and finally leaves the last vessel fairly concentrated in the form of *liquor* or *syrup*. This syrup is still more concentrated and boiled to a thick granular mass, a mixture of sugar grains and molasses, called *massecuite*, in special *vacuum pans*. The massecuite is really a mixture of crystallised cane sugar and molasses, containing dextrose, levulose, salts, and other impurities in solution, which prevent another lesser portion of cane sugar to crystallise. In the *centrifugals* this mixture is separated into raw sugar and molasses. The molasses may again be boiled down in vacuum pans, and form second and lower sugars. In the **refining** of raw sugars some of the impurities still adhering to the sugar crystals have to be removed

and this is done by redissolving the sugar in water and purifying and decolouring this solution by passing it through large filters containing granular *animal charcoal*. This charcoal is produced by careful heating of bones in closed retorts. It has the power of retaining impurities, particularly colouring matters; and the used charcoal may again be renovated by washing and reburning. The water-clear filtered sugar juice is then evaporated in vacuum pans. A short scheme of the production of sugar from cane is given in the appendix of this lesson; the different intermediate and final products and machinery are indicated by different kinds of type.

Cane sugar is liable to various forms of **fermentation.** *Yeast cells* break up cane sugar into invert sugar, which again continues to ferment, producing alcohol and carbonic acid. The bacteria of *lactic acid fermentation* also destroy cane sugar, more particularly in presence of lime salts, producing lactic acid, carbonic acid gas, and free hydrogen gas. This lactic fermentation is often accompanied and followed by *butyric fermentation,* in which lactic acid is changed into the disagreeable smelling butyric acid. Another organism changes cane sugar into a slimy jelly-like mass (*mucuous fermentation*), which occasionally is met with in sugar mills, and is also particularly favoured by the presence of lime salts. Quite recently a fourth form of fermentation has been discovered taking place in the sugar-cane itself, and this is the fermentation of cane sugar into cellulose.

Sugar is a very important article of diet, being easily digested and assimilated as a food. It is entirely a heat-producing food, and if taken in excess will lead to laying on of fat. Cane sugar as such is not directly assimilated, but has to be changed at first by the action of the ferment *ptyalin* in the saliva into invert sugar, and for this reason honey, which consists mostly of invert sugar, is more easily digested than cane sugar. **Molasses,** the by-product of sugar manufacture, which still contains a large amount of sugars, must be considered as a highly valuable food for cattle, horses, and pigs, particularly when used in connection with concentrated and dry foods rich in nitrogenous matters. Quite recently it has been discovered, on one of the American experiment stations, that **sugar** is an **antidote against sorghum poisoning,** and this fact makes the addition of molasses to any fodder like sorghum, cassava roots, sweet potato vines, which may contain a hydrocyanic or prussic acid yielding glucoside, doubly valuable, as the sugar in the molasses checks the decomposition of the glucoside and prevents the formation of the poisonous compound. The presence of such glucosides in sorghums and all other fodders belonging to this family of grasses, in maize, in many leguminous plants, in sweet potato vines, in cassava roots, is an undisputed fact; and sudden losses of cattle and pigs reported from time to time are due to this poison, and would have been prevented if molasses would have been fed at the same time, or if a drink of diluted molasses or even sweet milk would have been given to the affected animals. Cane sugar has antiseptic properties; strong solutions—syrups—will arrest fermentation, and for this reason sugar is used in the preserving of fruits, in the manufacture of jams, crystallised fruits, &c.

Milk, sugar, or **lactose,** $C_{12}H_{22}O_{11}+H_2O$, is the particular sugar found in milk, giving the milk its peculiar sweetish taste. Milk sugar is not so liable to alcoholic fermentation as cane sugar, but easily undergoes lactic fermentation, which causes the souring of milk when allowed to stand for some time.

$$\underset{\text{Milk sugar.}}{C_{12}H_{22}O_{11}+H_2O} \text{ (lactic acid ferment)} = \underset{\text{Lactic acid.}}{4C_3H_6O_3}.$$

Milk sugar, like dextrose, reduces Fehling's solution.

Malt sugar, or **maltose,** $C_{12}O_{22}O_{11}+H_2O$, is formed by the action of diastase on starch. Maltose again is easily changed into glucose. It is very probable that maltose is one of the forms in which starch is translocated in plants.

Many other sugars, belonging both to the groups of hexoses and saccharoses, but of less importance, are known to exist in plants.

Most of the sugars in solution have a peculiar action on certain modified (*polarised*) rays of light, passing through the solution, in turning the plane of the rays to the right or to the left. Cane sugar and dextrose are dextro-rotary, turning the plane to the right, whereas fruit sugar turns the plane to the left.

From the amount of this rotation the concentration of the solution or the amount of sugar in solution may be directly determined with the help of a *polariscope* or *saccharimeter*. The concentration of a sugar solution is also determined with the aid of *Beaumé* and *Brix spindles*, little instruments, made generally of glass, having a weighted bulb at the one end and a graduated glass stem on the other end, and which, when immersed into the sugar solution, sink more or less in accordance to the density of the liquid, which can be read off at once on the stem of the instrument. These instruments simply indicate the presence of any soluble substance in solution, which increases thereby the density of the water, be it sugar, salt, or any other substance; and for this reason the degrees Brix or Beaumé cannot indicate the correct amount of sugar, except in absolutely pure sugar solution.

Fats, oils, and waxes.

Fats and *oils* are found in seeds and fruits of many plants, more particularly in the seeds of rape, linseed, hemp, olives, nuts, almonds, earth nuts, coco nuts, castor oil seeds, &c. The grain of cereals also contains small quantities of fat, which in fodder analysis are generally recorded as *crude fat.*

Most of the fats are salts of the *fatty acids*—chiefly **Stearic, Palmitic, and Oleic acid,** with the trihydric alcohol **Glycerine,** $C_3H_5(OH)_3$. In the solid fats (tallow and suet) the stearic acid compound predominates; in the oils (olive oil, &c.) the oleic acid compound is the principal one.

Fats and oils are obtained from seeds by either of the following three methods:—(1) *Pressure*, (2) *extraction with solvents*, and (3) *boiling with water*. When seeds are to be extracted by pressure, the cleaned and shelled seeds are crushed, and then, with or without heating, subjected to heavy pressure, generally in hydraulic presses. The residue "oil cake" is used for feeding and also for manuring purposes, being rich in nitrogenous matters. For the extraction with solvents, the crushed seeds have to be treated with liquids like petroleum spirit, bisulphide of carbon, benzene, which all readily dissolve fats and oils.

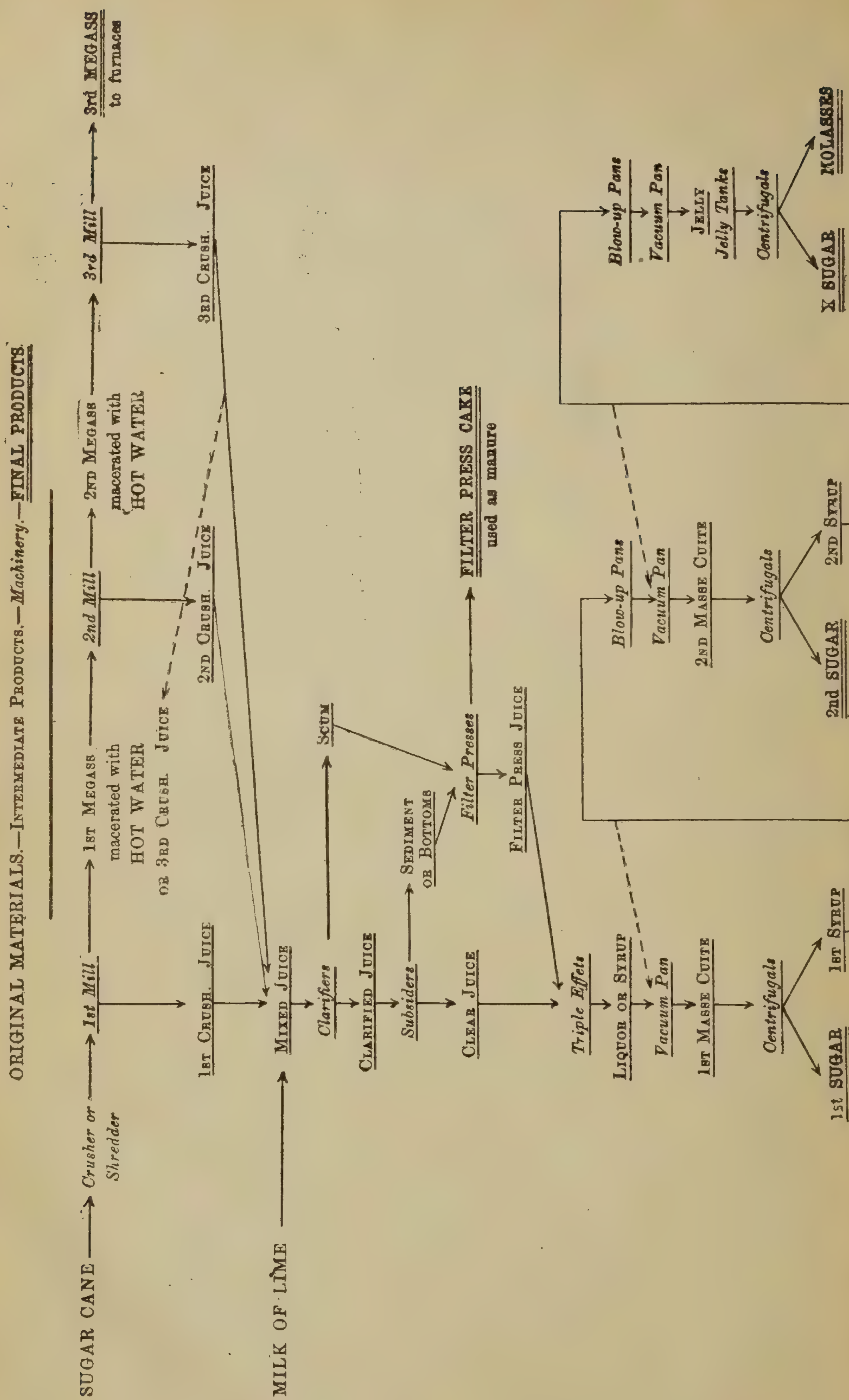
Fats and oils contain much less oxygen and comparatively more carbon and hydrogen than carbohydrates, and for this reason give when burned a greater amount of heat. The *calorific value* (see Fifth Lesson) of charcoal is about 8,000; of cane sugar and similar carbohydrates, about 4,000; of mutton fat, olive oil, rape oil, about 9,500; so that 1 lb. of fat gives as much heat as 2½ lb. of sugar. Fats are all lighter than water, and are insoluble in water, but soluble in ether, benzene, and in hot alcohol.

When heated, fats and oils decompose, producing acrolein, and at red heat combustible gases. Oils or fats intimately mixed with a little gum arabic and water form a milk-like fluid called **emulsion** (*Experiment 97*). A similar emulsion is obtained when shaking equal parts of limewater and olive oil or linseed oil (*carron oil*), which is a very valuable dressing for burns and scalds.

When heated with alkalies, under the action of certain ferments (*rancid fermentation*), and also when treated with superheated steam, fats and oils are decomposed into fatty acids and glycerine. This process is called **saponification,** as the fatty acids combine with any alkalies present, forming **soaps.**

Fats and oils are used as articles of food, for heating and lighting, as lubricants, in the manufacture of soaps, ointments, varnishes, &c. Certain oils possess the property of drying, becoming hard when exposed to the air. This change is a slow process of oxidation. Linseed oil, nut oil, and others are *drying oils*, and are used for painting. **Waxes** are compounds of fatty acids with other alcohols, generally monohydric alcohols.

SCHEME OF PROCESS OF MANUFACTURE OF SUGAR FROM CANE.



APPENDIX TO FOURTEENTH LESSON.

There are a few terms frequently used in connection with the sugar industry which may be well worth explaining:—

Quotient of Purity.—The greater the difference between the percentage of sugar indicated by the Brix spindle and the actual percentage as found by the polariscope, the greater the amount of impurities in the juice and the less the quotient of purity. The quotient of purity really indicates the percentage of cane sugar in 100 parts of the total solids in the juice. A juice with, say, 17·5 per cent. of Brix degrees or 17·5 per cent. of total solids in the juice, and with 16·2 per cent. of cane sugar, would have a quotient of $\frac{16{\cdot}2 \times 100}{17{\cdot}5} = 92{\cdot}6$, which is fairly high.

Pure Obtainable Cane Sugar, or, as it is often expressed, P.O.C.S. of cane, is the amount of sugar which should be able to be obtained from the cane by ordinary manufacture. The impurities in the juice will always prevent a certain amount of cane sugar to cystallise and tend to increase the amount of molasses, and, as a rule, it is considered that the P.O.C.S. is the cane sugar less ½ of the impurities. In above example, the impurities are $17{\cdot}5 - 16{\cdot}5 = 1{\cdot}3$, and the per cent. P.O.C.S. $= 16{\cdot}2 - \frac{1.3}{2} = 15{\cdot}55$ per cent.

Net Titre of sugar is, again, a trade term which takes in consideration the impurities contained in sugar when estimating the value of sugars for refining purposes. Several ways of calculating this value exist, but the one most in use is to deduct from the percentage of cane sugar in the sugar the amount of glucose + 5 times the ash. A raw sugar containing 92·4 per cent. of sucrose, ·6 per cent. of glucose, and 1·2 per cent. of ash would have $92{\cdot}4 - [{\cdot}6 + 5 \times 1{\cdot}2] = 85{\cdot}8$ N.T.

Experiment 95.—Put some cane sugar into a test tube, and heat slowly. The sugar will be seen to melt. When heated further browning will take place, leaving finally a charred mass.

Experiment 96.—Test cane-sugar solution before and also after inversion, with a few drops of hydrochloric acid, with Fehling's solution.

Experiment 97.—Mix in a mortar ½ oz. of olive oil, ¼ oz. dry gum arabic powder, and ½ oz. of water; rub well together, and add gradually 4 oz. water, to obtain a milky emulsion.

QUESTIONS TO FOURTEENTH LESSON.

1. To what class of organic compounds do sugars belong?
2. What is the difference between glucoses and saccharoses?
3. What is honey?
4. Why is honey easier digested than cane sugar?
5. How is dextrose prepared artificially?
6. What is the difference between grape sugar and fruit sugar?
7. What happens when cane sugar is heated?
8. How are carbohydrates produced in plant life, and in what forms are they translocated?
9. What different kinds of fermentation may cane sugar undergo?
10. Which part of the cane contains the purest sugar juice?
11. Why should sugar juices be evaporated at low temperatures?
12. What is the value of molasses as cattle food?
13. What are fats and oils?
14. What is saponification, and how is it brought about?

COTTON PAMPHLET.

We have received from Messrs. J. Kitchen and Sons, Limited, Eagle street, Brisbane, a neatly got-up pamphlet for free distribution, giving in condensed form all needful information to intending cotton-planters in this State. The "Notes on Sowing Cotton," on the last page, are by Mr. Daniel Jones, of the Department of Agriculture and Stock. There are also added a few useful miscellaneous tables, showing the number of cotton plants per acre planted at different distances; tables referring to the number of sheets of galvanised iron per ton; lengths and weights of plain and barbed wire fencing, &c. With this little *vade mecum,* the cotton-grower cannot go wrong, as the information given is short and clear from start to finish. Seed will be supplied during 1906 by the firm free to intending growers, and order forms accompany the pamphlet, which need only be filled up and posted to Messrs. J. Kitchen and Sons to meet with prompt response.

General Notes.

AGRICULTURAL COLLEGE OLD BOYS' UNION.

The annual meeting of the A.C.O.B.U. was held at the Department of Agriculture on Friday, 10th August; the president, Mr. J. Mahon, Principal of the College, in the chair. There was a fair number of ex-students, and there were also present Messrs. Brookes, A. J. Boyd, and other departmental officers. The minutes of the previous meeting were read and confirmed. The first business was the election of office-bearers for the ensuing year, which resulted as shown below. Mr. Webb brought up the question of a proposal to change the title of the union. The matter was freely discussed, and, on the motion of Mr. Webb, seconded by Mr. B. Corser, it was unanimously decided that the title be altered to "Agricultural College Ex-Students' Club."

The date of the next annual dinner was fixed for Thursday in exhibition week, 1907, and the secretary was instructed to engage the room at Eschenhagen's Café for that date.

It was decided that, with a view to ensuring the membership of students who are leaving the College at the end of their term, a notice be posted on the notice-board at the College, pointing out the advantages offered by the club to ex-students, and notifying the terms of subscription. With the consent of the Principal, the proposal was agreed to. Subscriptions will be received by Mr. Pitt, at the College, prior to the student's departure.

Mr. Mahon pointed out the desirability of ex-students who are engaged in farming and dairying and horticultural pursuits sending special exhibits to the National Association's exhibition, and offered a donation of £5 5s. as a prize for the best exhibit. The matter was warmly taken up by all present, and, on discussion, Mr. P. Rochat pointed out that it would be difficult for each of them to send exhibits of similar produce. He, for example, only grew wheat and bred sheep; consequently, he could only show wheat and wool, whereas others could show various kinds of farm produce and dairy products in addition. He would suggest that a combined exhibit be sent to form a trophy, although this need not militate against a man sending a trophy on his own account. The matter, after discussion, was left in the hands of Mr. Mahon to decide later on.

At this juncture the chairman was called away, and the Under Secretary for Agriculture, Mr. E. G. E. Scriven, took his place. In the course of an informal address to the members, he pointed out the advisableness of transferring the headquarters of the club from Maryborough to Brisbane. The secretary resided in the Maryborough district, and this was too far away from the centre of agricultural activity to enable him to carry out many of the duties of the office successfully. He would suggest that a secretary be appointed residing in Brisbane, and that he be an officer of the Agricultural Department, although not connected with the Department in his capacity of secretary to the club. Furthermore, he offered to members when in Brisbane the free use of the board-room at the Agricultural Department's offices. Here they could come and write their letters, make use of the Department's library, and generally use it as a literary club-room, except on such occasions when it was required for meetings or for examinations.

The members cordially fell in with Mr. Scriven's proposal as to the change of headquarters to Brisbane, and accorded him a hearty vote of thanks for granting the use of the room, it being understood that the concession was only granted to members of the club whose subscriptions were up to date.

Mr. Corser proposed, and Mr. Webb seconded, a hearty vote of thanks to Mr. Mahon for his assistance in starting the club, and thus enabling ex-students to meet together for the first time.

A unanimous vote of thanks was accorded to Mr. B. Corser for his services as secretary.

The secretaryship now devolves upon Major A. J. Boyd, editor of the "Queensland Agricultural Journal."

The office-bearers elected for the ensuing year are:—Patron, the Hon. D. F. Denham, M.L.A., Secretary for Agriculture and Railways. President: John Mahon, Principal of the Queensland Agricultural College. Vice-presidents: E. G. E. Scriven, Under Secretary, Department of Agriculture and Stock; J. P. Orr, Chief Clerk, Department of Agriculture and Stock; J. C. Brünnich, Chemist, Department of Agriculture and Stock; E. H. Quodling, Director of Agriculture; P. McLean, late Agricultural Adviser; P. M. Pitt; E. H. Gurny; G. B. Brookes, Farm Foreman, Queensland Agricultural College. Committee: Messrs. H. C. Webb, H. B. Corser, H. E. Andersen, P. Rochat, T. F. Bowler, L. C. Stupart, A. J. Conachan, F. L. Jones, W. Palmer, E. A. Byrne, D. W. Shine, J. Devereaux. Hon. Secretary and Treasurer, A. J. Boyd.

THE ANNUAL DINNER

of the members of the Agricultural College Ex-Students' Club took place on the 10th August. There was a good muster of "old boys," and there were also present the Hon. D. F. Denham, Secretary for Agriculture and Railways, Messrs. John Mahon (President, in the chair), J. C. Brünnich (Agricultural Chemist), E. G. Scriven (Under Secretary), J. P. Orr (Chief Clerk), P. McLean (late Agricultural Adivser), G. B. Brookes (Farm Manager, Gatton College), H. Macpherson (Manager, Biggenden State Farm), H. C. Quodling (Agricultural Inspector), A. Watt (late Farm Manager, Gatton College), A. H. McShane (Toowoomba), H. W. Mobsby (Artist to the Department), and the hon. secretary, Mr. B. H. Corser.

After justice had been done to an excellent dinner, Mr. Mahon apologised for the absence of his Excellency the Governor, who, he said, took a great deal of interest in agriculture. He also intimated that Mr. Toomey, president of the kindred association in Victora, had delegated Mr. McShane to represent Victoria. The toast of "The King" was then honoured.

Mr. Stupart proposed "The Parliament of Queensland," regretting the absence of the Minister for Agriculture (who arrived later).

Mr. B. Corser proposed "The Agricultural Department," and the toast was responded to by Mr. Scriven.

Mr. Bowler proposed "The Gatton College."

Mr. Mahon, the Principal of the College, in reply, ascribed the success of their show exhibit to the loyal support of the staff, to the energy of Mr. Brookes, who worked fifteen to eighteen hours a day, to the assistance given by the Agricultural Department, and to the Minister. He thought the College provided a greater number of farmers than any other institution in Australia.

The Hon. D. F. Denham arrived at ten minutes to 9, and was received with applause. He immediately proposed the toast of "The Old Boys' Union." Speaking of agricultural methods, he referred to the Campbell system, which had done so much for the arid districts of America, and which they hoped to demonstrate in the Maranoa. The Minister then discussed the importance of educating themselves on the making of ensilage and the building of silos, and spoke of the work Victoria was doing in this direction. If a farmer could get a loan of £50 from the Agricultural Bank to build a silo, he would certainly be able to repay it in a short time by the increased profits that would come through the bucket. After an allusion to the dairying industry, Mr. Denham concluded by expressing the hope that the union would become an institution which any retiring student would be proud to belong to.

Several of the old boys responded. Other toasts were—"The Union" (Mr. McLean), "Kindred Associations" (Mr. Quodling), "State Farms" (Mr. Rochat), and "The Press" (Mr. Orr).

LETTER FROM AN EX-STUDENT.

The following letter was addressed to Mr. J. Mahon by an ex-student, Mr. A. G. Blomfield, now working a grazing farm at Uralla:—

"Dear Mr. Mahon,—Just a line to let you know what I am doing, as I know you are always interested in your old students.

"My brother and I have got 3,600 acres of good, sound, sheep country, and are working it together. There are about 300 acres of good cultivation land on it, but for the present we will be occupied in getting the run into good order, as it is nearly all heavily timbered, and at present will only carry about 2,500 sheep, but we hope to have 3,000 or 4,000 in a few years' time. P. S. Bone is working with one of my brothers on a sheep station, and A. Bone is also on a big sheep station. Morse is helping his brother to manage one of his father's stations out in the West. Remember me to any of the old students who were at the College with me, and tell them I would be glad to hear from them."

[We should be glad if all ex-students would write to Mr. Mahon or to the Editor of this Journal, and inform them of their whereabouts and of their welfare.—Ed. "Q.A.J."]

THE DESTRUCTION OF RATS BY VIRUS.

Notwithstanding the ceaseless war waged against rats in all parts of the civilised world, the rodents continue their depredations in field, orchard, and poultry-yard. They make their destructive influence felt in the canefields as well as in the wheat stacks and corn bins. All sorts of poisons are tried, traps and gins are set, but to very little purpose. During the last few years, however, attention has been given, says the "Journal of the Board of Agriculture," to inoculation with a virus which sets up a virulent disease in the animals and quickly kills them. There are several such preparations before the public, some of which are fluid and some solid. Perhaps, on the whole, the fluid preparations are the most convenient to use, and they are certainly quite as effective as the others. The material consists of a nutrient medium containing the organisms (bacilli), which, when introduced into the body of a rat, set up a disease allied to the most virulent form of typhus fever. Dry bread, cut into small cubes, is soaked with the virus, and these cubes being laid down in suitable places are readily eaten by the rats, usually with fatal results. No domestic animals are at all affected by the preparation.

In order to test the value of the method, the Agricultural Chamber of the Province of Saxony obtained a supply of one of the preparations and distributed it amongst seven selected farms. The results show that at six of the farms the rats were practically exterminated. At the seventh the virus appears to have had little effect, a result that has also been noticed elsewhere, and which is supposed to be due to the fact that a natural attack of the same or a nearly-related disease had rendered the surviving rats practically immune to infection.

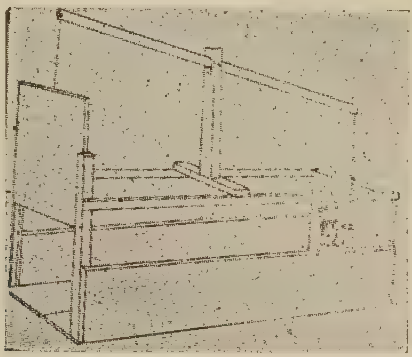
Information of a similar character has reached the board with regard to the use of rat virus in England, and they would, therefore, direct the attention of agriculturists to this means of getting rid of a troublesome pest. While there seems to be little doubt that in the majority of cases a single farm may be temporarily cleared of rats by this means, it is evident that but a short time may elapse before such a farm is again invaded by animals that move on to it from infested places in the neighbourhood. It would, therefore, appear to be highly desirable that agricultural clubs should take the matter up and act on a large scale, or the farmers in a parish or county might enter into a temporary association for the purpose of using the virus on every farm on a definite date. Operations on a large scale would mean considerable attention as to organisation, but the probable result would appear to warrant the necessary steps being taken.

A USEFUL DOG-TRAP.

The accompanying sketch of a dog-trap appears in the "New Zealand Farmers' Weekly." The maker, Mr. R. Hill, of Otaki, says:—

For the benefit of farmers who are troubled with dogs amongst their sheep, I am sending a rough sketch of a dog-trap, which I have found very useful.

Take four boards 9 x 1 and 5 feet long (two for the floor and one on each side), then make a framework 2 feet high, and cover with two or three thicknesses of strong wire netting. Bait with a sheep's head or piece of meat, with a loop on it. Pass the wire through the loop, and catch the wire on a nail projecting about ½-inch through the end of the trap.



It is also useful as a pig or poultry crate, or for feeding chickens in, by just lifting the lid high enough for them to enter.

[This trap should prove useful to farmers who keep a few sheep in dingo-infested country. One farmer at Wallumbilla lost forty-five sheep in one week last month by dingoes. We commend the trap to his notice.—Ed. "Q.A.J."]

EXPORT OF QUEENSLAND PORK.

Messrs. Webster and Co., who have been amongst the pioneers of the export of frozen pork from Queensland, are shipping 500 porkers to London per steamer "Durham," sailing on the 24th August. According to recent advices, the value of frozen carcass pork in London is about 5¼d., which should return the producer about 3½d. We have been permitted by Messrs. Webster and Co. to peruse correspondence regarding the pig export trade received from their agents in the United Kingdom—correspondence which supplies ample encouragement to pig-rearers in this State. Prior to the establishment of the direct mail service from Brisbane, the successful carrying out of an export trade in this commodity was rendered almost impossible by the private understandings of the oversea shipping companies. As this disability has been removed, and is not likely to be recreated, the Queensland pig-raiser has now a market for his product which is practically unlimited. Reverting to the correspondence above referred to, we make the following excerpts concerning a shipment made by Messrs. Webster a few months back:—"We are pleased to say" (write Messrs. Webster's agents) "that they turned out in exceeding satisfactory condition. Quality was very good indeed; if anything, perhaps the pigs were just a little too fat. We had quite a number of buyers inspecting them, and finally disposed of thirty of the carcasses at 5½d. per lb. ex cold store. We had previously arranged to send four of the heavyweight carcasses to a large firm of bacon-curers, and three to another firm of bacon-curers, and four of the light weights to a third firm of curers, all with a view of having the carcasses thawed out, and then boned and cured for bacon purposes. Hitherto all the carcasses sold in this country have been disposed of either to pork butchers or sausage manufacturers, &c., and it has appeared to us that it would be desirable to cultivate the bacon-curing section of the trade as well. We expect we will get a similar price for these eleven carcasses.

. . . Try and get shipments arranged for 1,000 pigs or more, shipments monthly, June to September. Best weights, 50 lb. to 80 lb. for porkers, 120 lb. to 150 lb. for baconers." A subsequent letter contains the report of a large bacon-curer in Ireland, to whom some of the pigs already referred to had been sent. This gentleman wrote:—"They have turned out splendidly. From the look of the pigs I feared that they would cut fat, but on opening them both myself and our foremen were surprised at the amount of lean meat. If they grow this class of pigs in Queensland, there is a fortune for whoever gets in there first. I am curing some sides in pickle as rolls and others as Wiltshire sides. . . . We have no pigs here showing the same amount of lean meat for the weight of the pig. Of course, if these pigs were killed and cured on the spot they would look much better, as the freezing causes the meat to contract. These samples will beat Canadian pea-fed for leanness, and will, I think, even beat Danish." Another curer, to whom four heavy pigs had been sent, wrote:—"The four pigs arrived in good condition, and we are cutting up same to-day preparatory to putting them in cure. . . . The carcasses are very dainty, the offal being much lighter than that of our Irish hogs, and the fat is very evenly distributed, running in a uniform line from chuck to ham."—"Brisbane Courier."

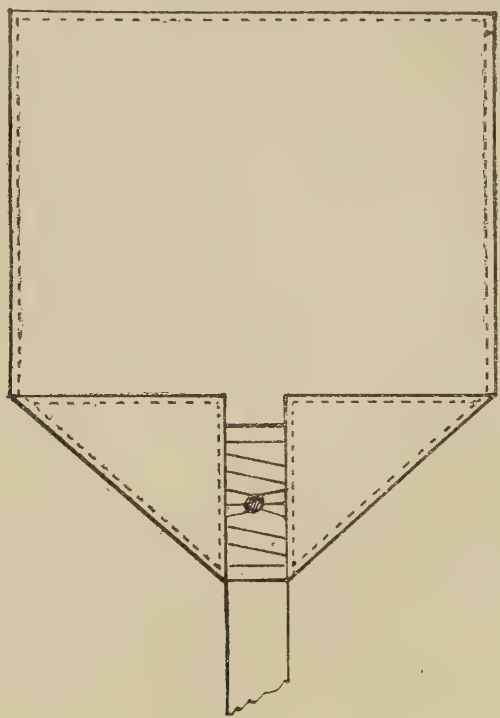
THE KING OF STRAWBERRIES.

A few weeks ago we received from Mr. C. A. Flay, nurseryman, Gympie, a box of strawberries which for size, colour, and flavour could not, we think, be excelled by any of the choice new varieties which have been produced by strawberry-growers at Mooloolah, Montville, and other districts where strawberries are a specialty in the fruitgrowers' orchards. Mr. Flay is one of the earliest strawberry growers in the State, and claims credit for being the means of bringing this industry to its present dimensions and perfection. For years, he, like many other earnest growers, has been experimenting, and considers that, at last, he has evolved "The King of Strawberries," which he has named "The Phenomenal." The following are its merits:—The fruit ripens early (in

the first week in June). The plant is prolific, hardy, the fruit of good colour and splendid flavour. One of its best qualities is the manner in which the foliage shelters the fruit from frost. This peculiarity alone makes it valuable to grow, especially in cool districts such as Gympie. Possessing these excellent characteristics, we should think that Mr. Flay may be congratulated on producing a variety which should take well with growers and consumers.

ANOTHER GOOD FIRE-BEATER.

We are indebted to Mr. D. Love, Dillalah Station, Charleville, for another idea for extinguishing bush fires which he has found very serviceable. It consists of a piece of ordinary canvas (as used for making waterbags), 4 feet long and 2 feet wide; double, then turn over 9 inches of the loose end each side to about 3 inches from the centre of the canvas; sew all round, about 1 inch from edge. Then get a supple stick, about 6 feet long, and bore a small hole near the small end, and attach the canvas to the stick with tie-wire. If water is handy, this will wear well, and outlast two basils. The sewing all round prevents the flame and heat from getting inside, and also prevents fraying.



It is claimed for the basil beater—the Wilson Scotia—that, as the same surface of the basil is not constantly used, the skin must necessarily outlast a beater with only one surface, but both are excellent implements, and canvas can often be got when basils are unattainable. The illustration clearly shows the method of folding, sewing, and fixing to the stick.

AGRICULTURAL AND HORTICULTURAL SHOWS.

The Editor will be glad if the secretaries of Agricultural and other Societies will, as early as possible after the fixture of their respective shows, notify him of the date, and also of any change in date which may have been decided on.

Answers to Correspondents.

SHEEP ON THE FARM.

IDERAWAY, Logan.—

It all depends on the quality of your land, the climate, the protection from native dogs, &c., what annual income you will derive from breeding sheep. A selector at Wallumbilla, who keeps about 250 sheep, told us that a month ago the native dogs took 40 of his sheep, as he had omitted to put them up one night. Here is what a farmer at Calca, South Australia, says on this very point of profit in sheep-breeding:—

In this district farmers should be able to keep 100 sheep all the year round on a 500-acre farm, 200 acres being under crop and 100 acres fallow. The land should be divided into small paddocks, to make the best of the feed. He would put in 50 acres each year with rape, manuring it with 50 lb. of super per acre. This should be fed off with sheep and cropped with wheat the following year. No manure need be added when sowing this paddock with wheat, as it will be enriched partly with the super and partly by the sheep-droppings. From the 100 sheep the farmer should have 50 lambs to sell and 30 ration sheep to kill each year, still keeping the flock up to its original numbers. The lambs should be worth 10s. each, and the ration sheep the same, making £40 in all, which, with £16 for wool, brings the return to £56 per annum.

ACETYLENE RESIDUE AND GIDYA ASHES AS MANURE.

INQUIRER, Barcaldine.—

1. The residue of acetylene gas manufacture is almost pure slaked lime, and it may be used as such to supply lime to the land. As it contains neither potash, phosphoric acid, nor ammonia, it is not a complete manure.

2. The ashes of most of our timbers have manurial value. "Gidya" ash contains 82·5 per cent. of lime, 1·9 per cent. of potash, and 1·5 per cent. of phosphoric acid. The ash of brigalow and belar is of similar composition, but the latter contains over 8 per cent. of potash. Ash of boree has not been analysed.

MAKING JELLY.

HOUSEWIFE, Nambour.—

Excellent jellies may be made by a new process described in a late Bulletin of the University of Wisconsin, U.S.A. Take plum jelly, for instance, although the process applies to other jellies. Place the fruit dry in jars. Two-quart jars are good for this purpose. Either place the jars in the oven in asbestos paper or in a fruit-steamer, and cook till the fruit is tender. Take out and strain through a flannel bag. Add as much sugar as juice, and stir until the sugar is dissolved. Place on the back of the stove, and heat slowly until it forms jelly drops on the spoon. During boiling, skim carefully. It will take but a little boiling, as this is pure juice. This process produces the clearest and finest plum jelly. The pulp may be used for jams or butter by straining through a sieve and adding equal amounts of sugar and heating slowly till thick enough. Place in jars, and seal as usual.

COW PEAS.

M. BRENNAN.—

Do not sow cow peas broadcast. At £1 per bushel, it is a wasteful method. Drill in at the rate of 10 lb. per acre. It will cover the whole ground. Sow from September to January. Plough down just as it begins to flower. In a very dry season the green manure will not decompose rapidly, but, as there appears to be a likelihood of good rains this year on the coast, you will be able to plant potatoes in February.

Farm and Garden Notes for October.

Field.—With the advent of warmer weather and the consequent increase in the soil temperature, weeds will make great headway if not checked; therefore our advice of last month holds with even greater force for the coming month. Earth up any crops which may require it, and keep the soil loose among them. Sow maize, sorghum, setaria, imphee, prairie grass, panicum, pumpkins, melons, cucumbers, marrows. Plant sweet potatoes, yams, earth-nuts, arrowroot, turmeric, chicory, and ginger. Coffee plants may be planted out. See our instructions in "The Sisal Industry in Queensland" (obtainable by intending planters on application to the Under Secretary, Department of Agriculture and Stock) as to the planting of *Agave rigida* or sisal hemp. The demand for this fibre is constantly increasing, and the supply does not overtake the demand, hence prices keep high. Plant only on *dry* soil. Cotton may still be sown.

Kitchen Garden.—Our notes for this month will not vary much from those for September. Sowings may be made of all kinds of vegetables. We would not, however, advise the sowing of cauliflowers, as the hot season fast approaching will have a bad effect on their flowering. French beans, including butter beans, may be sown in all parts of the State. Lima and Madagascar beans should also be sown. Sow the dwarf Lima beans in rows 3 feet apart, with 18 inches between the plants. The kitchen garden should be deeply dug, and the soil reduced to a fine tilth. Give the plants plenty of room, both in sowing and transplanting; otherwise the crops will be drawn and worthless. Thin out melon and cucumber plants. Give plenty of water, and mulch tomato plants planted out last month. Remember to water early in the morning or late in the evening; and next day stir the soil to prevent it caking.

Flower Garden.—Plant chrysanthemums, giving them plenty of water. The garden should now be showing the results of the care bestowed upon it during the last three months. Plant tuberoses, crinums, gladiolus, and other bulbs. Plant out palms and all kinds of tropical and semi-tropical plants. If the weather should be hot after planting, water and shade the plants. Roses should now be in full bloom. Sow dianthus and snapdragon; plant out coleus. Do as much work as possible now on dull, showery days. Having finished transplanting, the principal work will consist of raking and stirring the beds, staking, shading, and watering. As rose blooms fade cut off the spent flowers, and keep the bushes free from aphis.

Orchard Notes for October.

BY ALBERT H. BENSON.

Keep the land well cultivated, and, if dry, see that it is well stirred, but not turned. Attend to the disbudding of all young trees, for, if superfluous growths are checked now, they are converted into fruit-wood, and the vigour of the tree is thrown into those shoots which are to form the future branches of the tree. Disbud all vines, rubbing out all superfluous shoots, leaving only as many canes as the vine is strong enough to mature fruit to perfection on.

Sulphur all vines to prevent oïdium, as, if there is any muggy weather during the month, this disease is sure to make its appearance. Where Black-spot is present, spray the vines with Bordeaux mixture; and if caterpillars are troublesome as well, then add 1 oz. of Paris green to each 2 gallons of Bordeaux mixture, and both pests will be destroyed by the one spraying. When using Bordeaux mixture, there is no necessity to use sulphur for oïdium, as the Bordeaux mixture answers equally as well. Don't spray when the vines are in blossom; but with varieties that are shy setters it is often a good plan to sulphur when in blossom.

The nursery should be carefully attended to; where not already done, the ties of all grafts should be cut and the scions should be trained so as to make a single upright stem. Where buds have been put in, they should be started by cutting back the stock sufficiently to cause them to grow, but the stock should not be cut hard bark all at once, but by degrees, always leaving a portion of the stock above the bud to tie the young shoot to. Plant pines and bananas during the month, selecting suckers from healthy plants and from plants that are good croppers, and that produce good fruit, as a careful selection of suckers always pays well. Continue the treatment for Maori or Rust Mite of the orange recommended in the Notes for September; and where orange bugs, either the green or bronze, are present, destroy every mature insect that can be found, so as to prevent them breeding, as the killing off of the first crop will materially lessen their number for the season. Hand-picking, though slow, is probably the best remedy, though, before the insects are fully grown, large numbers may be destroyed by driving them on to the main branches of the trees and sweeping them off with a broom on to a cloth, from which they can be gathered and killed. Take every possible precaution against the fruit fly by destroying every infested fruit that you can. If there are maggots in cumquats or any other fruits, destroy every one, as the cleaner the sweep that is made of the first crop of flies the less trouble there will be throughout the season. Where Scale Insects have been introduced on young trees into clean districts, every care should be taken to keep the pest from spreading; and in cases where the young trees are badly affected it will pay the grower to destroy them at once, as the first loss will be the least. Where leaf-eating insects of any kind are troublesome—such as caterpillars of all kinds, the larvæ of the fig beetles, or the false ladybirds that attack all kinds of cucurbitous plants, potatoes, &c.—they can be readily destroyed by a spraying of Paris green, 1 oz. to 10 gallons of water, with lime added in as large quantity as can be got through the nozzle of the pump without choking, as this will tend to make the poison stick on better to the leaves, branches, or fruit.

LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Allora ...	Central Downs Agricultural and Horticultural Association	J. H. Buxton ...		
Allora ...	The Allora Farmers' Progress Association	P. Donovan ...		
Amby ...	Amby Farmers' Association	W. Jas. Sullivan ...		
Atherton ...	Barron Valley Agricultural, Pastoral, and Industrial Association	G. Bardon	5 and 6 July	4 and 5 July
Atherton ...	The Atherton District Farmers' Association	Fredk. Stewart ...		
Avondale ...	Avondale Farmers and Planters' Association	Edward J. Gayland		
Ayr	Lower Burdekin Farmers' Association	G. S. Mackersie ...		
Ayr	Lower Burdekin Pastoral, Agricultural, and Industrial Association	Philip Grout ...		
Ballandean ...	Lyra Farmers' Progress Association	M. B. Marlay ...		
Beaudesert ...	Logan and Albert Pastoral and Agricultural Society	A. Winship ...	20 June	8 May
Beenleigh ...	Agricultural and Pastoral Society of Southern Queensland	Wilson Holliday ...	15 Sept.	28 Sept.
Beenleigh ...	Logan Farming and Industrial Association	Wm. G. Winnett, Loganlea		
Biggenden ...	Biggenden Agricultural and Pastoral Society	C. J. Stephensen ...	6 and 7 July	5 and 6 July
Birthamba ...	New Hope Farmers' Association ...	G. W. Nixon ...		
Blackbutt ...	Farmers' Progress Association ...	John Dreghorn ...		
Boonah ...	Fassifern and Dugandan Agricultural and Pastoral Association	C. E. Mackenzie ...	17 and 18 May	6 and 7 June
Booyal ...	Booyal Farmers' Progress Association	Thos. Skillington ..		
Bowen ...	Pastoral, Agricultural, and Mining Association	Geo. Turner ...	11 Aug	17 Aug.
Bowen ...	Proserpine Farmers and Settlers' Association	R. Toogood ...		
Bowen (Proserpine)	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Bowen ...	Bowen Farmers and Fruitgrowers' Association	H. C. Smethurst ...		
Bowenville (Gordon Vale)	Moola Farmers' Progress Association	Alex. Gordon ...		
Brisbane ...	Horticultural Society of Queensland	F. W. Woodruffe ...	...	24 and 25 April
Brisbane ...	Queensland Acclimatisation Society	E. Grimley ...		
Brisbane ...	National Agricultural and Industrial Association of Queensland	Charles A. Arvier	8, 9, 10, and 11 Aug.	7, 8, 9, 10, and 11 Aug.
Brisbane ...	Queensland Nurserymen's Association	S. C. Matthews ...		
Brisbane ...	United Pastoralists' Association ...	Fredk. Ranson ...		
Brisbane ...	Queensland Chamber of Agriculture	F. W. Peek ...		
Brisbane ...	Queensland Citrus-growers' Asssociation	R. M. Cooper ...		
Brisbane ...	Combined Moreton Association ...	Wm. Ewart ..		
Brookfield ...	The Brookfield and Pullen Vale Farmers, Dairymen, and Fruitgrowers' Association	W. R. Moon ...		
Brooyar ...	Brooyar Farmers' Progress Association	E. Pike		
Buderim ...	Buderim Mountain Coffee and Fruitgrowers' Association	G. O. Burnett ...		
Buderim Mt.	North Coast Central Associatfon ...	James Lindsay ...		
Bundaberg ...	Bundaberg Horticultural and Industrial Society	H. E. Ashley ...		
Bundaberg ...	Council of Agriculture	H. J. Page ...		
Bundaberg ...	Woongarra Canegrowers and Farmers' Association	F. Watson ...		
Bundaberg ...	Bundaberg Agricultural, Pastoral, and Industrial Society	H. J. Page ...	14 and 15 June	26 and 27 Sept.
Burpengary...	Burpengary Farmers' Association ...	F. W. Uhlmann ...		
Byrnestown...	Byrnestown Farmers' Progress Association	Chr. H. Fredriksen		
Caboolture ...	Upper Caboolture Farmers' Association	Jos. Wilson ...		
Cairns ...	Aloombah Farmers' Association ...	N. P. Petersen ...		
Cairns ...	Cairns Agricultural, Pastoral, and Mining Association	J. Reid	7 and 8 Sept.	30 and 31 Aug.
Cairns ...	Cairns District Coffee-growers' Association	L. Battinson ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Cairns ...	Cairns District United Farmers' Association	Wm. Griffin ...		
Cardwell ...	Rockingham Progress Association ...	T. E. Fitzsimmons		
Charleville ...	Central Warrego Pastoral and Agricultural Association	G. M. Bell... ...		
Charters Towers	Towers Pastoral, Agricultural, and Mining Association	A. H. Pritchard ...	31 May, and 1, 2, 3 June	31 May, and 1, 2 June
Childers ...	Isis Agricultural Association	H. Epps		
Childers ...	Doolbi Mill Branch, Isis Agricultural Association	W. T. H. Job ...		
Childers ...	Childers Mill Branch, Isis Agricultural Association	H. Epps		
Childers ...	Childers Pastoral, Agricultural, and Industrial Society	A. Eastaughffe ...	1 and 2 June	14 and 15 June
Childers ...	The Childers Mill Canegrowers' Association	A. Eastaughffe ...		
Clermont ...	Peak Downs Pastoral, Horticultural, and Agricultural Society	F. Leysley		
Clermont ...	Peak Downs Dairymen and Settlers' Association	A. G. Pursell ...		
Cleveland ...	Cleveland Horticultural Society ...	Miles R. Fox ...	14 Oct.	
Clifton ...	Darling Downs Pastoral, Agricultural, and Industrial Association	S. J. B. Just ...	13 Sept.	12 Sept.
Coochin ...	The Coochin Farmers' Progress Association	J. T. W. McLaughlin		
Cooyar ...	Yeraman Creek Farmers' Progress Association	George Seely ...		
Cooran ...	Cooran Progress and Agricultural Association	Thos. Smith ..		
Cordalba ...	Cordalba Farmers' Association ...	J. Jeffrey		
Coulson ...	Coulson Farmers' Progress Association	G. R. Johnson ...		
Crow's Nest	The Crow's Nest Agricultural and Horticultural Society	James Gleeson ...	26 July	24 and 25 July
Croydon ...	The Gulf Mining, Pastoral, and Industrial Association	V. Creagh		
Cunnamulla	South Warrego Pastoral Association	J. Winward ...		
Dalby ...	Northern Downs Pastoral and Agricultural Association	E. Watt	26 and 27 July	25 and 26 July
Dallarnil Scrub, *viâ* Degilbo	Dallarnil Farmers' Association ..	Vincent H. Jones		
Danderoo ...	Danderoo Farmers' Progress Association	T. Campbe ...		
Deception Bay	Deception Bay Farmers' Association	B. J. T. Liscombe		
Degilbo ..	Degilbo District Farmers' Association	J. P. Laugher ...		
Dundowran, *viâ* Maryborough	Dundowran and Takura Settlers' Association	H. J. E. Tooth ...		
Esk	Esk Agricultural, Pastoral, and Industrial Society	Thos. C. Pryde ...	24 and 25 May	29 and 30 May
Eudlo ...	Eudlo Farmers and Fruitgrowers' Progress Association	Walter T. Jeremy		
Flagstone Creek, *viâ* Helidon	Flagstone Creek Farmers' Progress Association	James Scanlan ...		
Forest Hill ...	Forest Hill Agricultural and Progress Association	Wm. Jones ...		
Geraldton ...	Johnstone River Sugar-growers and Manufacturers' Association	Ralph Reid ...		
Gin Gin ...	Currajong and Gin Gin Agricultural and Pastoral Society	J. R. Hamilton ...	24 May	28 May
Gladstone ...	Gladstone Pastoral and Agricultural Association	W. J. Manning ...		
Gladstone ...	Port Curtis Agricultural, Pastoral, and Mining Association	J. T. S. Brown ...		
Gooburrum, Bundaberg	Gooburrum Farmers and Canegrowers' Association	W. J. Tutin ...		
Goombungee	Goombungee Farmers' Association ...	Thos. Smith ...		
Goondiwindi	MacIntyre River Pastoral and Agricultural Society	E. T. Drake ...	...	1 and 2 May
Goondoon, *viâ* Bundaberg	Goondoon Farmers' Association ...	J. F. Cory		
Gracemere ...	The Gracemere District Farmers and Progress Association	Arthur E. Fisher ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Gympie ...	Agricultural, Mining, and Pastoral Society	F. Vaughan ...	13 and 14 Sept.	15 and 16 Aug.
Gympie ...	Chatsworth Farmers' Progress Association	W. Allen		
Gympie ...	Deep Creek Farmers' Progress Association	H. Bath		
Gympie ...	Gympie Horticultural Society ...	Charles Brasch ...		
Gympie ...	Imbil Road Farmers and Settlers' Progress Association	D. J. O'Farrell ...		
Hambledon (Cairns)	Hambledon Planters' Association ...	W. L. Hawkins ..		
Harrisville ...	Harrisville Farmers' Progress Association	W. J. Burnett ...		
Haslemore, Victoria, Herbert Riv.	Herbert River Farmers' League ...	Alfred Henry ...		
Hatton Vale	Hatton Vale Farmers' Progress Association	P. Sharry, junr. ...		
Headington Hill	Headington Hill Farmers' Progress Association	J. E. Stehn ...		
Helidon ...	Helidon Scrub Farmers' Progress Association	James Sweeney ...		
Helidon ...	Monkey Creek Farmers' Progress Association, Withcott, Helidon	Thomas Turner ...		
Hendra ...	Nundah Agricultural, Horticultural, and Industrial Association	Geo. A. Patullo ...	28 Oct.	13 Oct.
Herbert River	Halifax Planters' Club	A. Campbell ...		
Herbert River	Macknade Farmers' Association ...	Edwin S. Waller ...		
Herbert River	Ripple Creek Farmers' Association ...	J. W. Grimes ...		
Herbert River	Fairford Farmers' Association ...	D. G. Scott ...		
Herbert River	United Farmers' Association ...	D. G. Scott ...		
Herberton ...	Mining, Pastoral, and Agricultural Association	John M. Hollway	...	22 and 23 May
Hodgson ...	Hodgson Farmers' Association ...	Fred. Warner ...		
Home Creek, *via* Wondai	Home Creek Farmers' Progress Association	A. Iker		
Hopetoun ...	Hopetoun Pastoral, Agricultural, and Progressive Association	John Walsh ...		
Hughenden...	Hughenden Pastoral and Agricultural Association	H. G. McLean ...	19 and 20 June	
Ingham ...	Fairfield Farmers' Association ..	B. Lynn		
Ingham ...	Gairloch Farmers' Association ...	B. Lynn		
Ingham ...	Herbert River Pastoral and Agricultural Association (Agricultural Show)	P. J. Cochrane ...	8 and 9 Sept.	
Ingham ...	Stone River Farmers' Association ...	F. A. Rankin ...		
Ingham ...	Victoria Farmers' Association ...	W. C. S. Warren...		
Ipswich ...	Ipswich and West Moreton Agricultural and Horticultural Society	P. W. Cameron ...		
Ipswich ...	Queensland Pastoral and Agricultural Society	J. McGill	14 and 15 June	20 and 21 June
Kelsey Creek *viâ* Bowen	Kelsey Creek Farmers' Progress Association	A. Fontaine ...		
Kolan, North	Kolan Canegrowers and Farmers' Association	Jas. H. Hendy ...		
Kilkivan ...	Kilkivan District Farmers and Settlers' Progress Association	J. H. McKewen ...		
Killarney ...	Killarney Farmers' Association ...	J. H Hansen ...		
Kingaroy ...	South Burnett Agricultural, Pastoral, and Industrial Society	T. J. Lacey ...	...	3 and 4 July
Laidley ...	Lockyer Agricultural and Industrial Society (at Gatton)	W. A. McIlwraith	13 July	4 and 5 July
Lakeside ...	Mungore Farmers' Association ...	C. C. Ridley ...		
Lillydale, Helidon	The Flagstone Creek Farmers' Progress Association	Danl. Ryan ...		
Longreach ...	Longreach Pastoral and Agricultural Society	J. P. Peterson ...	8 and 9 May	1 and 2 May
Lucinda Point	Victoria Farmers' Association ..	W. S. C. Warren...		
Ma Ma Creek, *viâ* Grantham	Ma Ma Creek Farmers' Progress Association	Joseph Turner ...		
Mackay ...	Agricultural, Pastoral, and Mining Association	F. Black		
Mackay ...	Pioneer River Farmers' and Graziers' Association	E. Swayne	7 and 8 June	20 and 21 June
Mackay ...	The Mackay and District Horticultural Society	Fred. Bourne ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Mapleton ...	Fruitgrowers and Farmers' Progressive Association	W. J. Smith ...		
Mareeba ...	Mareeba Mining, Pastoral, and Agricultural Association	F. Cruckshank ...		
Maroochy ...	Bli Bli Farmers' Progressive and Industrial Association	H. A. Keil... ...		
Maryborough	Maryborough Horticultural Society...	H. A. Jones ...		
Maryborough	The Island Farmers' Progress Association	H. Simpson, junr.		
Maryborough	Wide Bay and Burnett Pastoral and Agricultural Society	A. H. Jones ...	19, 20, and 21 July	23, 24, and 25 May
Miriam Vale	Miriam Vale Farmers' Association	J. Spencer		
Montville ...	Montville Fruitgrowers and Farmers' Progress Association	C. J. Wyer ...		
Mooloolah ...	Mooloolah Farmers' and Fruitgrowers' Progress Association	G. S. Skerman ...		
Mooloolah ...	The United Progress Association, Caboolture, No. 1 Division	C. Court ...		
Mosman River	Mosman River Farmers Association	Geo. W. Muntz ...		
Mosman ...	Mosman District Agricultural Society	G. W. Muntz ...		
Mount Cotton	Mount Cotton and Redland Bay Fruitgrowers and Farmers' Association	W. E. Burns ...		
Mount Marlow	Cannon Valley Farmers and Settlers' Association	R. E. Traill ...		
Mount Mee...	Mount Mee Farmers' Association ...	Jas. H. Robinson ...		
Mount Morgan	Mount Morgan Agricultural, Pastoral, and Poultry Society	J. S. Lyle ...		
Mount Ubi, Eumundi	The Kenilworth Farmers' Association	Alex. Purdon ...		
Nambour ...	The Rosemount Association	George Etheridge		
Nambour ...	Dulong and Kureelpa Farmers' and Canegrowers' Association	A. A. Petrie ...		
Nambour ...	The Obi Obi Farmers and Dairymen's Progressive Association	A. D. Crichton ...		
Nanango ...	Nanango Agricultural, Pastoral, and Mineral Society	J. W. Sigley ...	12 and 13 April	9 and 10 May
Nanango ...	Coolabunia Farmers' Association ...	Ezra Horne ...		
Nanango ...	Malar Farmers' Association	A. Becker		
Nerang ...	Southern Queensland and Border Agricultural and Pastoral Association	H. J. Cooper ...	13 Oct.	14 Sept.
North Isis ...	North Isis Canegrowers' Association	T. E. Barnes ...		
North Pine ...	Moreton Agricultural, Horticultural, and Industrial Association	N. McKenzie ...		
Oakey ...	Oakey Agricultural and Pastoral Society	E. R. Pace		
Palmwoods ...	Palmwoods Industrial Fruitgrowers' Progress Association	H. Taylor		
Peachester, *viâ* Beerwah, N.C. Line	The Peachester Progress Association	R. G. Denny ...		
Pittsworth ...	Pittsworth Pastoral, Agricultural, and Horticultural Association	C. Longland ...	7 and 8 Feb.	31 Jan.
Pomona ...	Pomona Agricultural and Progress Association	H. Armitage, senr.		
Port Douglas	Port Douglas and Mosman Pastoral, Agricultural, Horticultural, and Mining Association	H. McMahon ...		
Port Douglas	Daintree Farmers' Association ...	J. Carlos Allen Donally		
Proserpine ...	Preston Farmers' and Settlers' Association	R. C. Dagg ...		
Roadvale ...	Roadvale Progress Association ...	Henry Clark ...		
Rockhampton	Alton Downs Farmers' Association...	Thos. Thomasson...		
Rockhampton	Central Queensland Farmers and Selectors' Association	T. Whitely, Coowonga		
Rockhampton	Central Queensland Stockowners' Association	R. R. Dawbarn ...		
Rockhampton	Rockhampton Agricultural Society...	A. S. Tompson ...	16 and 17 June	20, 21, and 22 June, 1907

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Roma ...	Western Pastoral and Agricultural Association of Queensland	Angus McPherson	18 and 19 July	17 and 18 July
Roma ...	Yingerbay Farmers' Association ...	R. Frederick ..		
Roma ..	Roma Farmers' Association	Duncan Brown ...		
Roma (Blythedale)	Waroby Farmers' Association ...	S. S. Jones... ...		
Rosewood ..	Farmers' Club	P. H. Adams ...	6 and 7 Sept.	5 and 6 Sept.
Sandgate ...	Queensland Beekeepers' Association	A. H. W. Clarkson		
South Kolan	South Kolan Farmers and Planters' Association	John Whalley ...		
Southport ..	Southport Horticultural Society ...	E. Fass		
Spring Bluff	Aubigny Farmers' Progress Association	J. R. Torbock ...		
Springsure ...	Queensland Pastoral Society... ...	G. R. Milliken ...		
Stanthorpe ...	Border Pastoral, Agricultural, and Mining Society	Geo. Simcocks ...	9 and 10 Feb.	22, 23, and 24 Feb.
Stanwell ...	The Stanwell Agricultural Society ...	A. Spanner ...		
Stanwell ...	Stanwell District Farmers' Agricultural and Progress Association	W. Crowe		
St. George ...	Balonne Pastoral and Agricultural Association	T. M. Cummings ...		
Sunnybank ...	The Runcorn and Sunnybank Agricultural Society	S. Robertson ...		
Taabinga ...	The Taabinga Farmers' Progress Association	T. Pass		
Tannymorel, *viâ* Warwick	The Tannymorel Farmers' Progressive Association	Maurice Clifford ...		
Teutoberg ...	Teutoberg Farmers' Progress Association	E. M. Nothling ...		
Tiaro	Tiaro District Farmers' Progress Association	L. H. Riddles ...		
Tinana ...	Tinana Fruitgrowers and Farmers' Association	H. G. Habler ...		
Toowoomba...	Queensland Vine and Fruit Growers' Association	Hy. A. Tardent ...		
Toowoomba...	Royal Agricultural Society of Queensland	G. A. Leichney ...	1, 2, 3, and 4 Aug.	1, 2, and 3 Aug.
Townsville ...	Townsville Pastoral, Agricultural, and Industrial Association (formerly North Queensland Pastoral and Agricultural Association)	J. N. Parkes ...	6, 7, and 8 June	6 and 7 June
Upper Kedron	Upper Kedron Fruitgrowers and Farmers' Association	A. Marshall ...		
Upper North Pine	Upper North Pine Farmers' Association	J. Skerman ...		
Wallumbilla	Wallumbilla Farmers' Association ...	Edmund H. Yates		
Warren Siding	The Stanwell United District Farmers' Union	G. N. Terry ...		
Warwick ...	Eastern Downs Horticultural and Agricultural Association	F. H. Selke ...	15 and 16 Feb.	13, 14, and 15 Feb.
Wellington Point	Wellington Point Agricultural, Horticultural, and Industrial Association	Louis Hugonin ...	15 July	14 July
West Haldon, *viâ* Greenmount	West Haldon Farmers' Progress Association	A. E. Ayris ...		
Wondai ..	Mondure Farmers' Progress Association	W. E. Horne ...		
Woodend ...	Warren-Woodend Farmers' Club ...	W. Lehfeldt ...		
Woodford ...	Woodford Progressive Industrial Association	E. Heaton		
Woombye ...	Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society	P. S. Hungerford...	12 and 13 July	11 and 12 July
Woombye ...	Woombye Fruitgrowers' and Progress Association	E. E. McNall ...		
Woondum ...	Woondum Farmers' and Planters' Association	Chas. E. Gambling		
Wooroolin, *viâ* Nanango	Wooroolin Farmers' Progress Association	A. Deighton ...		
Yandina ...	Yandina-Maroochy Progress Association	Chas. Ablin ...		
Zillmere ...	Zillmere Horticultural Society ...	E. H. Decker ...		29 Sept

Public Announcements.

The EDITOR will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the EDITOR, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, covers in boards and cloth will be supplied from this office on application to the Under Secretary for Agriculture and Stock. Applications must be accompanied by a remittance of SIXPENCE to cover cost. For the convenience of those who are not within reach of a bookbinder, a Special Cover has been designed, which obviates the necessity for binding. These covers will be supplied at ONE SHILLING each.

In order to avoid disappointment, correspondents who wish for replies to questions in the *Journal* are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

For the information of those who are desirous of communicating with the managers of State farms, we give their names and addresses below:—Queensland Agricultural College, Gatton, principal, J. Mahon; Westbrook State Farm, Westbrook, manager, C. Ross; Biggenden State Farm, Biggenden, manager, D. Macpherson; Hermitage State Farm, Warwick, manager, Alexander Martin; Gindie State Farm, manager, R. Jarrott; Kamerunga State Nursery, Cairns, manager, Howard Newport; Roma State Farm, manager, R. Soutter; Botanic Gardens, director, J. F. Bailey.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

PURCHASE OF STOCK AND PRODUCE FROM THE DEPARTMENT OF AGRICULTURE.

Purchasers of Stock and Produce, Plants, Seed, &c., from the State Farms and Agricultural College are reminded that Sales from these Institutions are made for Cash only. Persons desirous of making purchases should, therefore, first ascertain the cost of whatever articles they desire to obtain, and remit the full purchase-money when sendiug an order.

HERMITAGE STATE FARM.

A number of FINE YOUNG TURKEY GOBBLERS are for SALE. For particulars, intending buyers are requested to communicate with the Manager, Hermitage State Farm.

QUEENSLAND AGRICULTURAL COLLEGE.

FOR SALE.

PURE-BRED PIGS, all from imported stock, including Berkshires and Large and Middle Yorkshires.

PRICE:

Boars, £2 2s.; Sows, £1 1s., f.o.b. at Gatton Railway Station.

Orders for Pigs of the Yorkshire breed will be accepted upon the condition only that delivery will be given within a reasonable time after receipt of order; orders already received taking precedence.

POULTRY.

Brown Leghorns, cockerels, pullets, and hens.

Silver-grey Dorkings, cocks, cockerels, and pullets.

Old English Spangled Game, cockerels and pullets.

Plymouth Rocks, cockerels and pullets.

Minorcas, cockerels and hens.

White Wyandottes, cocks and hens; cockerels and pullets.

Silver-laced Wyandottes, cocks, hens, and cockerels.

Black Orpingtons, cockerels, pullets, and hens.

Buff Orpingtons, cockerels, pullets, and hens.

White Leghorns, cockerels, pullets, and hens.

Brown Leghorns, Silver-grey Dorkings, and Old English Spangled Game will be available in the course of the next two or three months.

Prices from 10s. each and upwards (f.o.b. Gatton).

Eggs of the above breeds available in season, 10s. per setting—nine guaranteed fertile. Should less than nine prove to be fertile, the infertiles will be replaced if returned carriage paid. This rule will be strictly adhered to.

Applications for Settings of Eggs, accompanied by Remittance, may be made to the Principal, Queensland Agricultural College.

There are at present no pure-bred Bulls for Sale; and, owing to the large number of orders booked, it will be some time before any are available.

The following Stud Animals are available for Service at the College Farm, at a charge of FIVE SHILLINGS for Ordinary and TEN SHILLINGS for Pure-bred Cows:—

IMPORTED SHORTHORN, JERSEY, HOLSTEIN, GUERNSEY, AND AYRSHIRE BULLS.

The following Bulls imported from Great Britain are also available for service, at a charge of 10s. per head for all cows:—

Ayrshire Bull, SPECULATION.
Shorthorn Bull, BURTON SPOT.

Sows may be served also at a charge of 5s. per head by imported Berkshire, Tamworth, and Yorkshire Pigs.

JOHN MAHON, Principal.

QUEENSLAND AGRICULTURAL COLLEGE.

The College, which is situated within 4 miles of Gatton and 1 mile from the College Railway Siding, comprises 1,692 acres, and the buildings can accommodate 60 Students.

TERMS.

Twenty-seven Pounds per annum, paid half-yearly in advance. Students are also charged One Pound per annum each for medical attendance, the sports fund, and for guarantee fee.

The course of instruction includes PRACTICAL AGRICULTURE in all its branches, DAIRYING, GARDENING, STOCK-BREEDING, and MECHANICAL ARTS. Classes are also held daily for THEORETICAL INSTRUCTION in these branches, as well as in SURVEYING, CHEMISTRY, &c.

The College Calendar, giving full particulars, may be obtained on application to the Principal at the College, or to the Under Secretary for Agriculture and Stock, Brisbane.

BURSARIES.

Four bursaries are given annually. An examination for these is held in June or July of each year. Bursaries will be awarded upon the following conditions:—Candidates (males) to be from fifteen to seventeen years of age, of sound constitution, and in good health; they must have resided in the State for the two years immediately preceding the time of their examination for such bursary, or their parents must have resided in the State three years immediately preceding such examination. The bursar is entitled—subject to good behaviour and the pleasure of Parliament—to free board and instruction as a resident student for a period of three years. He is required to take up his residence at the College within one month of the publication of the results of the examination; otherwise he forfeits his right to a bursary.

From and after 1st January, 1907, the AGE of CANDIDATES for Admission to the College as Students will be Sixteen Years instead of fifteen.

STATE FARM, WESTBROOK.

MAIZE AND PUMPKIN SEED.

STAR LEEMING MAIZE.

A Limited Quantity of Seed is now ready for distribution.

Price: SIX SHILLINGS per bushel, f.o.b., Westbrook.

The strain has been improved by careful selection, and the Seed is from the Centre of the Cobs only.

SILVER NUGGET PUMPKIN.

The Seed of this, the best of all Table Pumpkins, is also an excellent strain.

Price: SIX SHILLINGS per lb.

Both the above have been saved from isolated crops, no other varieties of maize or pumpkins being grown near them.

To expedite delivery, application should be made direct to the MANAGER, Westbrook State Farm, together with remittance to cover Cost of Seed and Freight.

COTTON SEED.

We have been requested to notify Cotton Planters that Messrs. J. KITCHEN AND SONS, Limited, are prepared to supply UPLAND COTTON SEED FREE for this year's planting, and that the firm will pay the railage on all Cotton consigned to them during this year and 1907. The railage which has been already charged to Cotton Suppliers will be refunded to those who have sent in supplies.

NOMINATED IMMIGRATION.

RESIDENTS OF QUEENSLAND

Desirous of Assisting their Friends or Relatives in the United Kingdom or other parts of Europe to EMIGRATE to Queensland, may procure full Information from any Clerk of Petty Sessions, or from the Immigration Agent, Brisbane.

The following shows THE SCALE OF PAYMENTS for Nominated Passages:—

Sex.	Between One and Twelve Years.	Between Twelve and Forty Years.	Above Forty and under Fifty-five.	Fifty-five and Upwards
	£	£	£	
Male	2	5	10	The full amount of Passage Money, £15 15s
Female	1	3	10	
Infants	Free			

STATE NURSERY, KAMERUNGA, CAIRNS.

RUBBER, COCOA, KOLA-NUT, CAROB BEAN, KAPOCK, VANILLA, CARDAMON, AND OTHER VALUABLE TROPICAL ECONOMIC PLANTS FOR SALE.

The Instructor in Tropical Agriculture notifies that PLANTS of the above useful and valuable AUXILIARY PRODUCTS may be obtained by application to the Manager, Kamerunga State Nursery. PLANTS available at any time. SEEDS when in season, and which, BEING MOSTLY OF SHORT VITALITY, should be promptly applied for.

RAMBONG and PARA RUBBER, CARDAMON, and KAPOCK PLANTS, 1s. each, or 10s. per dozen; others, 6d. each, or 5s. per dozen; plus packing, railage, or postage.

ALL SEED, 6d. per packet.

Seed of CENTRAL AMERICAN RUBBER (*Castilloa elastica*) available November to January; and of PARA RUBBER (*Hevea braziliensis*) from February to April.

Lists of Tropical Economic Plants available may be obtained on application to the Manager, Kamerunga State Nursery, Cairns, North Queensland.

RUBBER SEEDS FOR SALE.

The Manager of the Kamerunga State Nursery notifies that SEEDS of the RUBBER-TREE (*Castilloa elastica*), WHICH ARE OF VERY SHORT VITALITY, are available at the Nursery for distribution. As these seeds cannot be guaranteed for more than a few weeks, Immediate Application should be made for them. COCOA PLANTS, raised from last year's seed, can also be obtained.

PRICE OF COCOA PLANTS, 6d. each; a reduction being made per dozen.

RUBBER SEED, 6d. per ounce.

A Small Charge will be made for other Plants, Cuttings, and Seeds. A List of Prices may be obtained on application to the Manager, Kamerunga.

By Authority: GEORGE ARTHUR VAUGHAN, Government Printer, William street, Brisbane.

VOL XVII PART 4

The Queensland Agricultural Journal

October, 1906.

For terms of Subscription
SEE PUBLIC ANNOUNCEMENTS.

FCW

Edited by
A. J. BOYD, F.R.G.S.Q.

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THE

Queensland Agricultural Journal,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

Edited by A. J. BOYD F.R.G.S.Q.

VOL. XVII. PART 4.

OCTOBER,

By Authority:
BRISBANE: GEORGE ARTHUR VAUGHAN, GOVERNMENT PRINTER.
1906.

CONTENTS.

NOTICE.

Queensland Agricultural Journal.

It is hereby notified that the *Journal* will be supplied to all members of Agricultural and Horticultural Societies who do not derive their livelihood solely from the land, on payment, in advance, of an annual subscription of 5s., which will include postage. Schools of Arts will be supplied at the same rate.

Persons resident in Queensland whose main source of income is from Agricultural, Pastoral, or Horticultural pursuits, which fact should be stated on the attached Order Form, will receive the *Journal* free

ON PRE-PAYMENT OF 1s. PER ANNUM,

to cover postage.

To all other persons the annual subscription will be 10s., which will include postage.

All remittances should be made by postal notes or money orders, but where they are unobtainable stamps will be accepted, though the Department accepts no responsibility for any loss due to the latter mode of remitting.

For your convenience an Order Form is attached. A cross on each side of the Order Form indicates to the recipient that his subscription is again due.

Amount of one year's subscription should therefore be forwarded with Order Form, without delay, to the UNDER SECRETARY, Department of Agriculture and Stock, Brisbane.

All subscriptions received for the *Journal* after the seventh day of the month will commence with the month after that on which payment is received. Previous copies available will be supplied at 6d. per copy.

ORDER FORM.

To the Under Secretary, Department of Agriculture and Stock, Brisbane.

For the enclosed*..please forward me THE QUEENSLAND AGRICULTURAL JOURNAL for One Year.

Name...

PLEASE WRITE PLAINLY.

Address...

....

Occupation...

* State amount according to above rates.

Agriculture.

SILOS AND SILAGE.

It would be well if all those interested in farming and stock-breeding would bear in mind the inexorable fact that the physical history of the world invariably repeats itself. What has been in the past will infallibly again be in the future, whether the result be advantageous or injurious to man. As there have been, and will be again, periods of plenty and prosperity, of rich harvests, green fields, and increasing stock, so there have been, and again will be, periods of bad harvests, absence of herbage and water, and consequent decimation of stock. Alternate periods of drought, flood, and genial seasons are a characteristic of the geographical position, the geological formation, and the climatic conditions of the continent of Australia.

Accepting these statements, as they must be accepted, as facts, borne out by the experience of a hundred years of white settlement, it behoves us to consider, not only the means of disposal of superabundant crops, whether of wheat, sugar, or fruit, or of abundant supplies of dairy products, of cattle, horses, sheep, and pigs, but what is of even greater importance, the means of combating the most destructive of all the enemies of the "Man on the Land"—drought.

For all ills there is a remedy, if it can only be found, and if, when found, men are wise enough to apply it in time, and we are now concerned with the means at hand of minimising, if not of completely neutralising, the effects of long-continued drought.

Consider our late splendid seasons, and think of the enormous wealth of green crops in the farming districts, the vast areas of rolling downs in the West, densely clothed with rich, fattening grasses, which have been so much in evidence during the past four years. Then carry the mind back to the four years preceding 1902, when the Western country was a desert, when the flocks and herds died by millions, when the farmer could raise nothing to sell or to feed his starving stock, helplessly dying off until stall and byre were tenantless, when the sugar-planters, instead of crushing their cane and turning out thousands of tons of sugar, could put the stunted crop to no other use than to sell it as green fodder. We desire to bring these two pictures vividly before the mind's eye, in order to bring home to the primary producer the culpable negligence of which he was then guilty, and of which he will yet again be guilty, unless he can be awakened to the fact that the safety and lives of his stock, and, consequently, his own livelihood, depend upon his care and forethought. No dairy stock need perish during a drought; not a cow or sheep need starve, although the heavens be as brass. Every dairy farmer and grazing farmer has it in his power to prevent this. But how hard it is to induce men to move in the right direction; how easily do they forget the cruel lessons of the past. Let but the genial rains fall, let the wheat and the grass and the lucerne cover the ground, and straightway all the evil days are forgotten in the luxury of the present, and men are contented to say, "As it is to-day, so will it be to-morrow." But to-morrow may provide a sad awakening, and then the careless farmer is in the position of the grasshopper which sang all the summer but made no provision for winter. The grasshopper died, and so did the cattle.

It seems almost superfluous to tell men on the land how to avert the evil results of drought, for all have heard of

THE SILO,

but few are aware that the first silo in the Australasian States was constructed in the early days of colonisation, by a South Australian farmer, a Mr. Charles Rake, of Enfield. Dairy farmers from the neighbouring colonies visited South Australia to see how silage was made. Then they went back and adopted the ensilage of fodder with highly profitable results. From that day the silo became an institution in the States (then called colonies). But the erection of silos is still anything but universal amongst stockowners, and until it is so we shall not cease driving their value into men's minds until the farmer without a silo will be looked upon as a *rara avis in terris*.

THE PRINCIPLE OF THE SILO.

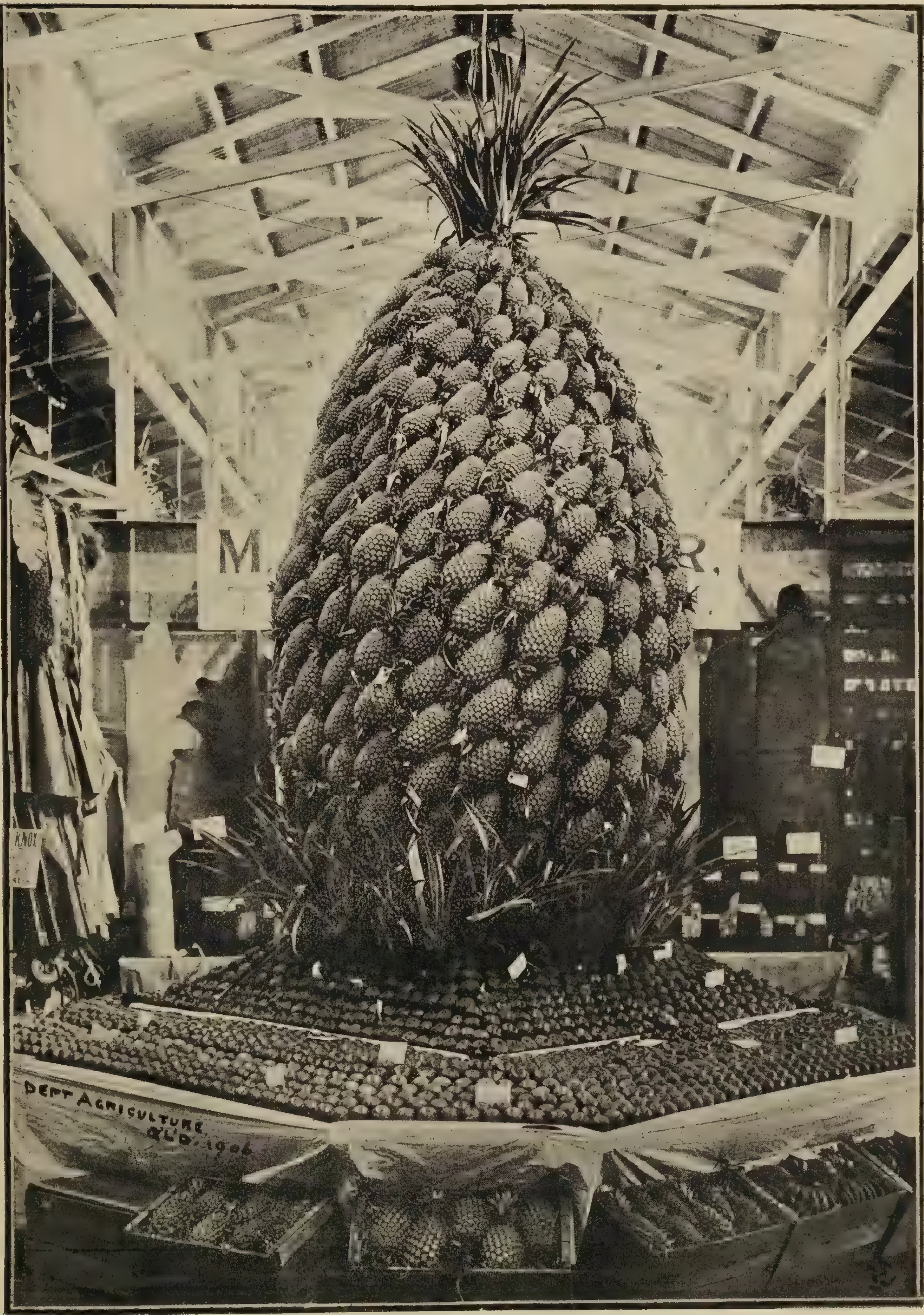
The burying of brewers' grains and certain forage crops, says Storer ("Agriculture in some of its Relations with Chemistry"), has long been customary in certain localities, without subjecting them to any process of drying, by merely treading the fresh forage firmly into pits, or, as the French say, "Silos," and covering it with earth. In recent years, instead of digging mere holes in the earth, it has been found advantageous to build the silo in the form of a high bin or compartment, in, or close to, the barn in which the ensilage is to be fed out to animals. As an improvement on the old pit plan, silos were covered with boards weighted with bags of sand or stones, but when high, deep silos were constructed, it was discovered that very little extraneous pressure was needed in a tight, well-covered bin, and to-day the material in the silo is usually only covered with a layer of bush grass or waste chaff a foot or two in thickness.

The principle on which the preservation of silage is based is mainly fermentation and the checking of fermentation. It is a matter of experience that green vegetable matters packed firmly in a silo or tightly compressed in a stack, do not ferment rapidly and putrefy as they would do if they were left in loose heaps. The fermentations which actually occur in a well-ordered silo are, comparatively speaking, mild in form and small in degree. It is true that in a silo a certain amount of fermentation always occurs at first, and that the degree or amount of this fermentation may vary considerably, according to the kind and condition of the crop, and with the circumstances under which the crop has been stored. But in a well-ordered silo this incipient fermentation soon ceases after the air which was entangled in the forage has been used up. It is known, moreover, that the action of the microscopic organisms which cause fermentation is checked by the accumulation of certain chemical substances which are produced during the fermentation, notably by lactic acid and by the carbonic acid gas which saturates the materials and tends to preserve them from decay. Perhaps it is as much for retaining carbonic acid gas inside the silo as it is for excluding the outside air that practical men insist on the importance of avoiding open cracks, permeable walls, and even devices for draining off water from the silo. . . . Generally speaking, the fermentation of silage will be less pronounced in proportion as air has been more completely excluded from it by taking pains to cut the fodder fine and by treading it into the silo firmly and carefully. During the process of fermentation the temperature of the silage rises considerably—to 90 degrees, 100 degrees, or 120 degrees Fahr., or even to 130 degrees, 150 degrees, or 160 degrees. At temperatures above 160 degrees an inferior, dark-coloured, or even black, "burnt" product is obtained.

TEMPERATURES AT WHICH ACIDS FORM.

In a silo filled with well-matured fodder-corn, it is possible to reduce the amount of fermentation and the heat of fermentation to very low terms by cutting the corn stalks fine, filling the silo rapidly, treading the material

Plate XVII.



PINEAPPLE TROPHY IN THE MORETON DISTRICT EXHIBIT.

thoroughly, and weighting it heavily. . . . Many observers have noticed, and especially as regards immature corn fodder and other kinds of crops, that when the heat of fermentation is low, larger quantities of acids are formed than is the case at higher temperatures. The English chemist Voelcker has even gone so far as to admit that ensilage produced at temperatures lower than 122 degrees is always more or less sour. This fact is so generally recognised that the terms "sweet" ensilage and "sour" ensilage are not infrequently used to characterise products obtained under such conditions that the heat of fermentation has risen to 125 degrees or 140 degrees, or more, or has been less than 120 degrees. . . .

In order the more readily to obtain temperatures of 122 degrees to 125 degrees or more, the fodder put in on the first day is not levelled at once, but allowed to remain in a loose pile in the middle of the silo until it is well heated and the fodder for the next layer is ready to be put in. The hot ensilage is then levelled and packed at the corners, and immediately covered with fresh fodder of the next layer. With a similar purpose in view, the last load or two of the fodder of each layer is left in a pile in the middle of the silo until ready to fill in the next layer.

It is said to be well to crown up the material somewhat at the middle in order to ensure a constant pressure against the side walls while the mass is settling. Finally, a covering of cut straw or coarse hay and tarred paper is added. This cover should be well packed at the sides and corners, and a few loose boards may be laid on to keep it in place. . . . There is a common impression that—barring the inevitable waste of material—the quick hot-fermentation of maize ensilage is favourable for sweetness. The character of any given sample of ensilage depends largely upon the temperature to which it has been subjected, and the temperature may, in many cases, depend on the amount of pressure which has been put on the materials at first.

Loss of Material in Silos.

Generally speaking, it is not at the surface of the silo nor through mouldiness that the chief waste occurs. On the contrary, the loss of material in converting forage to ensilage is caused, for the most part, by fermentations due to imperfect exclusion of air at the beginning of the process. . . . A loss of 50 per cent. has been noticed in the case of lupines, and 27 per cent. in that of lucerne, 31 per cent. in the case of red clover, and even 43 per cent. in the case of some mown clover that had been heavily rained upon. As regards Indian corn, losses amounting to 33 per cent. and 35 per cent. have been observed, though, when proper care is exercised, the loss from corn ensilage need not be more than half as large as these amounts.

Use of Germicides in the Silo.

It was customary in Germany, long ago, to strew salt between the layers of ensilage as it was put into the crude earth-pits of those days, and good results were obtained, and experiments were made of putting slaked lime upon beet-pulp in silos. There can be no doubt that this idea of checking fermentation by means of chemicals may have real merit in some cases. Professor Storer here cites a case in which a highly successful experiment was made in Sweden by Alex. Müller, who employed bi-sulphide of carbon as the germicide agent. A lot of mown grass, which, through foul weather, had begun to decay as it lay on the ground, was thrown up into a heap or stack, together with a quantity of buckwheat and sunflower plants, of the leaves of cabbages, the tops of beets, and some small roots, and some straw and chaff. The several layers of the heap were sprinkled with bi-sulphide of carbon during the process

of building it. When the stack came to be opened, the fodder was found to be a compact, well-preserved mass, which was readily and greedily eaten by cattle. The odour of the bi-sulphide had entirely disappeared.

Opening of Silos.

It is well not to begin to feed out the contents of a silo until six or eight weeks after the materials have been stored, or until fermentation has ceased. As a matter of course, it usually happens that several months elapse after the filling of a silo before it is opened. As regards Indian corn at least, it is known that silos may be left unopened for two or three years without any serious loss or waste other than the interest on the capital lying dead. Indeed, it is accounted one great merit of corn ensilage that reservoirs of it may be kept during long periods, to be opened only in times of dearth. . . .

When a silo is opened, it is important not to take out from it at any one time more of the ensilage than can be fed out in the course of a day, lest the loose material suffer harm through fermentation. Moreover, in removing ensilage from a silo, care must be taken to proceed in such wise that no large surface of the matter left in the silo shall long be exposed to the action of the air. If ensilage were to be left uncovered for several days, moulds would grow upon it, and the surface layer might decay. . . . It is said to be well to build the silo of such shape and size—as related to the number of animals to be fed—that a fresh layer, several inches in thickness, will need to be taken off every time the animals are fed. In this point of view, several small silos will be found to be more convenient than a single large one.

Maize Ensilage.

In regions where Indian corn can be grown readily there are several strong incentives for saving this crop in the form of ensilage. It is easy to grow enormous quantities of fodder corn on comparatively small areas, and methodically to store the crop in silos in the short days of autumn, and in dull or threatening weather, and this advantage is particularly marked in regions where the climate is normally unfavourable for the curing of fodder corn in autumn. . . .

The hauling and handling of the large quantities of water (80 to 90 per cent.) in green corn stalks at the time of pitting them is, of course, a great disadvantage, though it appears to be more than off-set by the fact that this labour admits of being methodised, and that it can be applied with comparatively little reference to the weather. The rehandling of the ensilage, when it is fed out, is not specially laborious, because no very large amount of material is moved at any one time; and there is no little advantage in having a succulent material so palatable as ensilage is to give variety to the winter food of cattle. . . .

At the moment of filling the silo it is customary to cut the corn plants to lengths of an inch, or three-quarters of an inch, or half an inch—some say 2 inches, though Goffart has urged that it is well to cut the stalks to lengths of one-third of an inch. When the fodder is thus cut, even to 2-inch lengths, the material is easily handled, it packs closely, and the air which would naturally remain in the spaces between the corn stalks can be pretty thoroughly expelled. But the cutting is not absolutely necessary, and not a few farmers have dispensed with it, although it is known to be highly advantageous in that the cut material lies closer in the silo, takes up less room, is more easily stowed away and compressed, and much more readily handled when it comes to be removed. Everyone admits, moreover, that when long corn stalks are packed in a silo they must be trodden down very firmly, and that care must

be taken to avoid air spaces between the stalks lest the ensilage should become mouldy around these spots of air. American experience has taught very decidedly that it is best, as a general rule, to allow the corn plants to become tolerably mature before putting them in the silo. There are, in fact, very good reasons why mature plants should be preferred, for it is known that there is an enormous accumulation of useful carbohydrates in the corn plant during the later stages of its growth. . . . Practically, it has been found that the more mature the grain is, while the stalks remain green, the better and sweeter the ensilage will be, and it is now a common practice as regards flint-corn not to cut the stalks until the grain has begun to glaze, or has just passed the glazing stage, while dent-corn is allowed to stand until the kernels are well dented. . . .

On the other hand, it is not well that the crop should be allowed to get so mature that the stalks have become somewhat dry, and there is a risk that this result may happen in case the harvesting should be delayed through press of other farm work or by bad weather."

With this we conclude our quotations from Storer's valuable chapter on silos and ensilages.

Depth of Silage Important in Reducing Necessary Loss.

The depth of silage in the silo is the chief factor which determines the closeness with which it is packed, and, consequently, the completeness with which entangled air is expelled and outside air prevented from working downward from the top or towards the centre from the walls in case there should be any leak there.

To ensure the best silage, says Mr. F. H. King, of the Agricultural Experimental Station of the Wisconsin University, and the least loss of dry matter, it is important that the silage should have a depth at the close of filling of not less than 24 feet, and 30 feet is better than 24 feet. Under these conditions, the silage is so compact in its lower two-thirds that even if the walls are a little open the silage is so close and is pressed so hard against the walls that air would enter it much slower than if the pressure were less. When the silo stands until spring before it is opened, the necessary losses in the upper 4 to 6 feet of silage may reach 20 to 24 per cent. of the dry matter put in, and this may be true also even when only the upper 12 inches appear decayed or mouldy.

The Weight of Silage per Cubic Foot.

The weight of corn silage increases with the depth below the surface, with the amount of water in the silage, and with the diameter of the silo. One cubic foot of silage will weigh, on an average, about 45 lb., and every 50 cubic feet of the volume of the silo will hold 1 ton.

The Capacity of Silos.

The capacities of silos increase more rapidly than do their depths, so much so, that a silo 36 feet deep will contain nearly five times as much silage as one only one-third of that depth; and when it is remembered that there is less necessary loss with deep silage, the importance of depth will be appreciated.

Doubling the diameter of the silo increases its capacity a little more than four times, while trebling its diameter increases its capacity nine-fold. It is evident, therefore, that the cost of storage decreases rapidly with increase in the size of the silo.

Mr. King supplies the following tables on the capacities of silos:—

Table giving Inside Dimensions of Silos which will allow the Silage to be Fed Down at a Mean Rate of about 2 or 3 inches daily, assuming 40 lb. of Silage at time of filling, to be fed to each cow daily. Capacity of each silo sufficient for 180 days.

No. of Cows.	Silo 30 feet deep without partition.					Silo 24 feet deep with partition.				
	Contents.		Round diameter in feet.	Square sides in feet.	Mean depth fed daily.	Contents.		Round diameter in feet.	Square sides in feet.	Mean depth fed daily.
	Tons.	Cubic ft.			inches.	Tons.	Cubic ft.			Inches.
30	108	4,091	15	12 x 14	2	108	5,110	17	16 x 16	3·2
40	144	6,545	16·75	14 x 16	2	144	7,347	20	18 x 18	3·2
50	180	8,182	18·75	16 x 18	2	180	9,184	22	20 x 20	3·2
60	216	9,818	20·5	18 x 18	2	216	11,020	24	22 x 22	3·2
70	252	11,454	22	20 x 20	2	252	12,857	26	22 x 26	3·2
80	288	13,091	23·5	20 x 22	2	288	14,691	28	24 x 26	3·2
90	324	14,727	25	22 x 24	2	324	16,531	29·75	26 x 28	3·2
100	360	16,364	26·5	24 x 24	2	360	18,367	31·25	28 x 28	3·2

Silage for Summer Feeding.

As methods of farming become more and more extensive, farmers will come to use silage as a part ration during the whole year. The silo must ultimately supplant the pasture, except as a place for airing and exercise, and no other method of soiling can prove as economical as the silo when properly constructed and handled.

If silage is fed every day in the year from a single filling, either more than one silo must be used or else the depth of the silo must be increased to about 40 feet, and in this case the rate of feeding could not exceed an average of 1·4 inches per day. Still it is my judgment that this rate of feeding is preferable to having two silos, for I have shown that the loss from spoiled silage at the surface after 180 days, when this is used as cover, is 22 lb. per square foot, or 5·1-3 tons for a silo 25 feet in diameter.

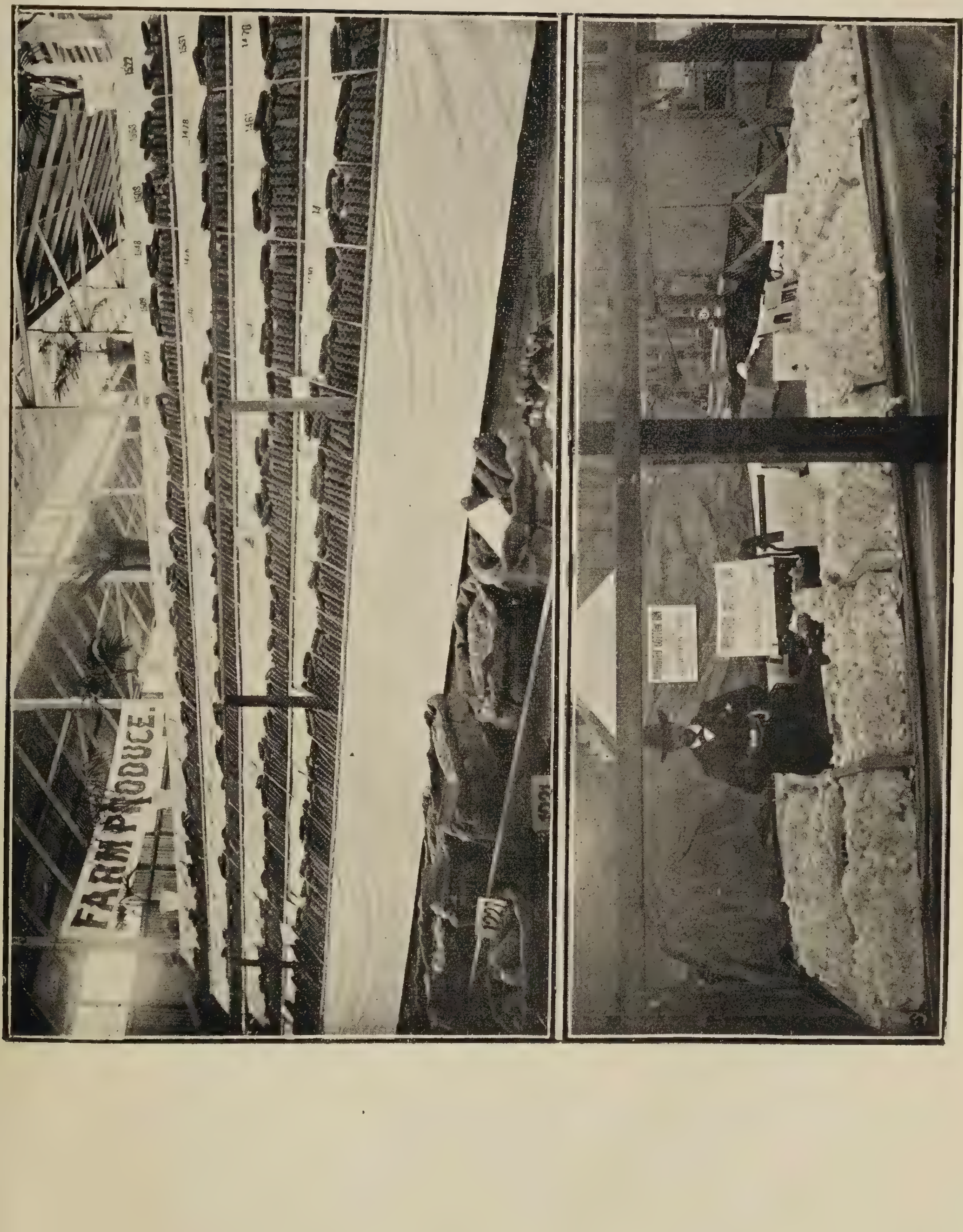
Table giving the Inside Dimensions of Silos which will allow Corn Silage to be Fed Down at the Mean Rate of 1·6 inches per day, allowing 35 lb. of Silage daily per cow for 258 days; the depth of the Silo being 34 feet.

—	Round Feet.	Square Feet.
For 20 cows, diameter of silo	12·75	11·5
For 30 cows, diameter of silo	15·6	13
For 40 cows, diameter of silo	18	16
For 50 cows, diameter of silo	20·1	17·9
For 60 cows, diameter of silo	22	19·5
For 70 cows, diameter of silo	23·9	21·1
For 80 cows, diameter of silo	25·5	22·5
For 90 cows, diameter of silo	27	23·9
For 100 cows, diameter of silo	28·5	25·25

Mr. Walter Madden (Victoria) says: "The same 50 acres of green stuff that would produce 100 tons of hay, at a cost of about £1 per ton for making, would produce 300 tons of silage at 2s. per ton for the making. The 300 tons of silage, when made, would be worth at least double the amount per ton that the hay would be worth."

Ten tons of green fodder equal 3 tons of hay, and 10 tons of green fodder will make almost 10 tons of silage. The hay would feed a beast for 120 days, and the silage for 400 days, and, in addition, the silage-fed beast will milk better than the hay-fed one. The milk produced by silage is richer in cream; the butter is sweeter and of a better colour, and the cost of feeding is about one-half as compared with bran and chaff.

Plate XVIII.



THE NATIONAL ASSOCIATION'S EXHIBITION AT BOWEN PARK, 1906.

1. Corn Cob Competition Exhibits. 2. The Cott

A building 20 feet long, 12 feet broad, and 10 feet high to the eaves, with an additional height of 6 feet from the eaves to the ridge, will contain 2,880 cubic feet. As each 50 cubic feet of silage weighs a ton, this gives 57 tons 12 cwt. as the capacity of the silo.

Various Forms of Silos.

With regard to the style of building, all experts are agreed that the round or tub silo is far preferable to the square or oblong building, mainly for the important reason that it has no corners, where, unless extreme care is exercised in treading in, air is likely to lodge, and thus injure the material.

NOTES ON BUILDING SILOS.

By Thos. Cherry, M.D., M.S., Director of Agriculture, Victoria.

The following simple and clear instructions for building an overground silo by Dr. Cherry, we take from the Victorian Year Book of Agriculture for 1905. In his preliminary remarks, the Director says: "In America the stave silo is the favourite, but it is not so well adapted to our requirements on account of the way our hardwoods shrink and warp as they dry. If built of 2-inch Oregon or redwood, the cost is very much greater than the frame silo built in the way described below. The hoops for the stave silo are made of $\frac{3}{4}$-inch round iron, and lugs and nuts are arranged the same as those of a cyanide vat, so that the staves may be tightened up from time to time.

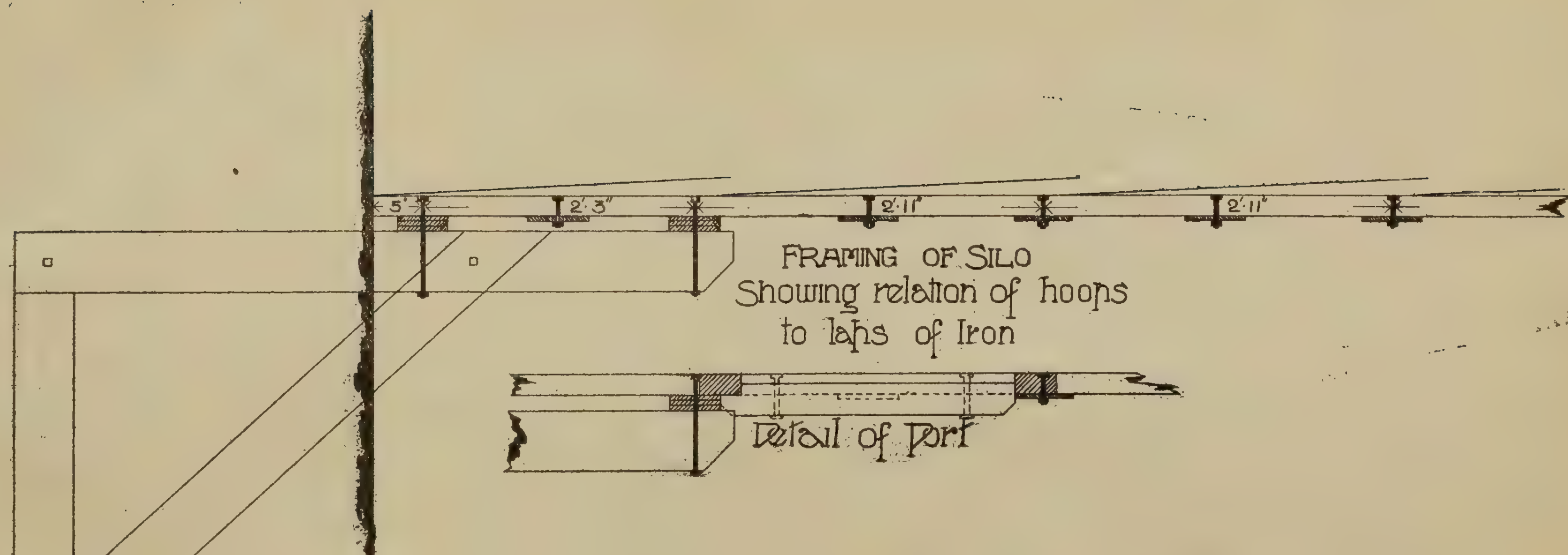
In building a wooden silo, it must be remembered that the internal pressure on the walls before the silage sets amounts to about 350 lb. to the square foot at a depth of 26 feet. Hence, the framing must be rigid and very strong. The only way in which this can be secured is by building it on the same principle as the cask. The wood or iron bands corresponding to the hoops are made of a thickness to correspond with the size of the silo. Square buildings usually bulge at the sides or crack at the corners. The wood silo may be erected on a brick foundation, the latter extending 6 feet, or deeper, into the ground. Examples are here shown of this class of silo.

Probably the most satisfactory method, giving the best possible results as far as quality of the silage is concerned, and reducing the cost of construction to the minimum, is to build the silo above ground, making the frame and hoops of hardwood and the lining of plain iron. Twenty-four gauge galvanised iron is the best for this purpose, but black iron coated with tar or anti-corrosive paint on both sides will last a lifetime. In all cases the inside receives a coast of whitewash immediately before filling, to neutralise any acid that may be formed by the silage.

How to Build an Overground Silo.

The following considerations are to be borne in mind:—

1. The foundation must be firm enough to secure the silo when empty against the force of the wind.
2. The woodwork close to the ground must be protected against dry rot and white ants.
3. The material for the hoops requires to be straight-grained and free from knots and gum veins. A long lap is made at each splice, and bolts used so as to avoid splitting the timber.
4. The iron lining requires to have a lap of about 3 inches at the joints. If the clout nails are not more than 4 inches apart, the lining alone will be strong enough to take the pressure of the silage. The nails must be in the centre line both of the lap and of the stud.



MATERIALS FOR SILO, 15 FEET DIAMETER, 21 FEET HIGH.

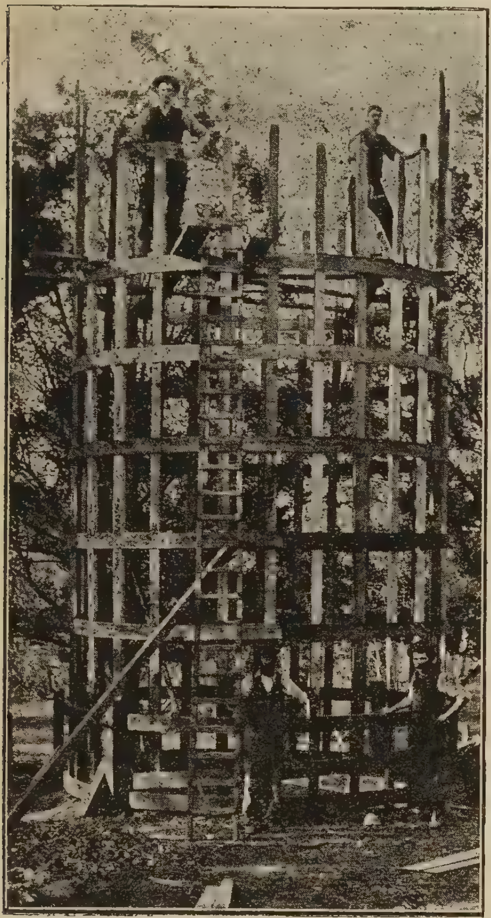
6 x 4 Redgum, 8/6, 8/5, 8/4.
4 x 2 Hardwood, 27/21, 6/24, 1/20, 6/16.
3 x 1 ,, 2/12.
6 x 1 ,, 4/11.
6 x ½ ,, 60/18.
8 6 x ½ Bolts, Nuts, and Washers.

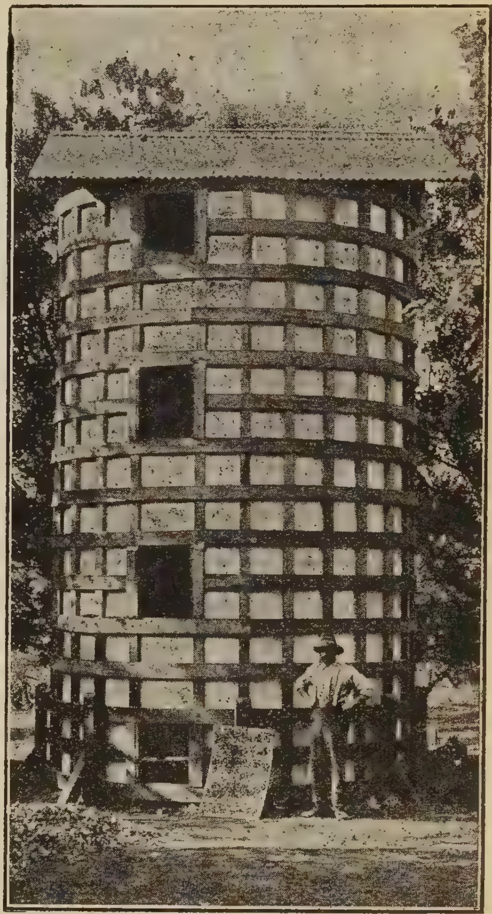
16 9 x ½ Bolts, Nuts, and Washers.
16 8 x ⅜ ,, ,, ,,
250 3 x ⅜ ,, ,, ,,
100 4 x ⅜ ,, ,, ,,
56 sheets 6 x 3 x 24 G. plain Galvanised Iron.
16/8 sheets Corrugated Galvanised Iron.

3 lengths 14" ridging.
2 lb. springhead nails.
20 lb. assorted wire nails, mostly 2".
20 lb. 1" clouts.
2 lb. tinsmiths' rivets.
4 gallons tar or elastic carbon paint.

SPECIFICATIONS FOR SILO 14 FEET 8 INCHES INSIDE DIAMETER AND 21 FEET HIGH.

All the materials used are to be of approved quality and the best of their kind. The timber to be specially free from knots and gum veins. The foundation posts, bottom hoops, and the bottom 3 feet of the studs to be tarred before fixing.





THE FOUNDATION.—Prepare eight foundation posts (6 inches by 8 inches red gum), as shown in the sketch. Bolt the sole and post together edgeways, and halve the strut both in post and sole. Secure with ½-inch bolts. Fix a peg in centre of site, and with a trammel 7 feet 8 inches in length describe a circle. Dig for and, when in position, fill in and well ram the posts 3 feet in the ground and 3 feet out of it, so that the inside face of each post is true to the end of the trammel. From the centre line of this face to the same line in the next post is 5 feet 10 inches, measured straight. Be careful to keep the inside face of each post exactly perpendicular. Make a composite curved plate by nailing three of the 6-inch by ½-inch boards to the inside of the posts, carefully springing the first of them to the circle described by the trammel. Make butt joints, and let each successive hoop break joints. This hoop should be kept at least an inch above the ground. They require, for the present, only to be lightly nailed together, as they will be bolted to the posts in the way to be described below. A similar triple hoop is fixed so that its upper edge is 35 inches from the ground. These two curved plates are used to fix studs in upright position safely.

THE FRAMING.—The framing is made of 4-inch by 2-inch hardwood studs, placed sideways on the inside of the hoops. They are marked and bored for the ⅜-inch bolts before fixing. The ends are kept an inch off the ground. Every fourth stud comes opposite one of the posts, and these are bolted with

8-inch by $\frac{5}{8}$-inch bolts passing right through the posts and studs. The intermediate ones are bolted with 4-inch by $\frac{3}{8}$-inch bolts to the curved plates. In all cases keep the nuts on the outside of the silo, so that they may be tightened as the hardwood shrinks. The spaces between the studs (except the pair which take the port holes) are $13\frac{1}{8}$ inches clear, measured on the inside edge of studs. A sheet of iron should be tried against every fourth stud, so as to see that the lap is correct. The hoops are $17\frac{1}{2}$ inches apart, centre to centre. The upper hoops are marked as to the line at which they will cross each stud before they are fixed, so that the diameter of the silo remains the same all the way up. This is done by first bending them round the outside circle of studs at 3 feet from the ground, and marking the position of each stud on the hoop. (Of course, the hoop must be fixed to the stud from which it was marked.) The lap of the two boards forming the hoops should be from 24 inches to 30 inches, according to the quality of the timber, so as to more than cross two adjacent studs. Bolts are passed through these studs and both hoops as shown in Fig. I.; $\frac{3}{8}$-inch bolts to be used to secure the hoops at every alternate stud. If the end of a hoop is cracked, bolt over the lap a fishing piece to cover three studs. The studs are kept plumb as the hoops are fixed. The first one to be erected should be one of the sides of the port holes.

THE LINING.—Twenty-four gauge galvanised iron is used. The lap is 3 inches on the studs, and 1 inch top and bottom. Press the sheets out to the line of the circle before nailing; 1-inch or $1\frac{1}{4}$-inch clout tacks are used, 3 inches apart along the lap, and 6 inches apart on the other studs. Three tinsmith's rivets to be used between each stud to secure the horizontal lap. The edge of the lower sheet in each lap is *inside* the upper sheet, so as to exclude the weather.

THE ROOF.—Construct roof by bolting three 16-feet 4-inch by 2-inch purlins to the top of the studs of each half of the silo, allowing a pitch of about 3 feet to the ridge. Use 24-feet studs for the purpose of carrying the purlins, placing them in the circle where directed. Cover the roof with 8-feet corrugated iron, 26-gauge, allowing one and a-half corrugations lap, with spring head nails at every third corrugation. Provide and fix three lengths of galvanised iron ridging, 14-inch.

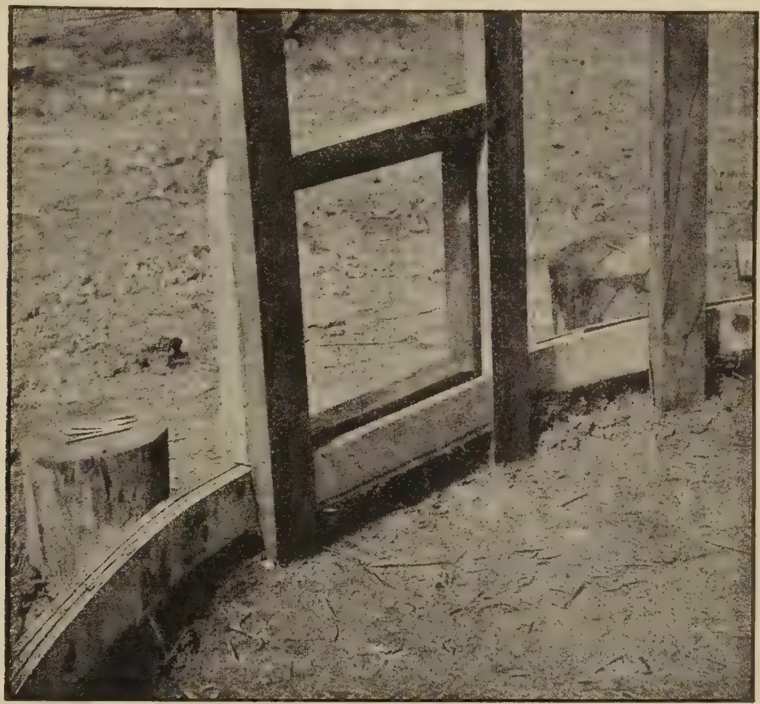
THE PORT HOLES.—The space between the last stud and the one first erected is made 22 inches clear. This makes the space between the last and the last but one less than 13 inches. A port is made in every second row of iron, the sill of the first one being 3 feet from the ground. The sill and lintel are made of 4-inch by 2-inch, the top of the sill being 1 inch above the top of the hoop. The studs are backed up on their outer surface between the sill and lintel by pieces of 4-inch by 2-inch, which are notched to cover the ends of the hoop corresponding to the middle of the port, and the whole secured with $\frac{3}{8}$-inch bolts. The sill is nailed to the inside of the hoop so that it is flush with the studs on the inside. The stops are 3-inch by 1-inch, set 1 inch back from the inside face. The rectangular piece cut from the corresponding sheet of iron is backed up with three or four pieces of 6-inch by 1-inch, each 22 inches long, so that they fit close against the stops. The iron sheet then laps 1 inch or more all round the inside, and the pressure of the silage keeps the door against the stops. The doors are placed into position as the silo is filled, and they are knocked back into the silo as each becomes exposed, as the silage is emptied from the top. Short lengths of 4-inch by 2-inch studs may be placed between each lintel and the sill above, to support the iron lining.

ROOF.—The roof may be left until the silo has been filled, as the silage forms a good scaffold to work from. The easiest method is to thatch it with straw, a few light saplings being laid across on top of the uppermost hoop, the straw thrown on top of them, well topped at the centre, and secured by

Plate XIX.

1. Varieties of Cotton from the Queensland Agricultural College.
2. Dried and Preserved Fruits from the College.

a few strands of fencing wire from side to side. Another method is to make a low-pitched roof, as in the specification. The gable takes the head of the elevator. This roof may be covered with iron paling or ruberoid. The circular conical roof looks best, and is easily made. A light frame is secured to the tops of every third stud, and the rafters carried up to a centre post. It may be covered with flat iron, ruberoid, or 12-inch by 1-inch boards, which



have been ripped diagonally, so that all the points may be turned to the centre post. The need for a roof is much less in dry districts, and it will be found that the rain which drifts down the inside of the half-empty silo does most of the damage. Still, when the silo has been built full height, it is advisable to complete the roof.

The Cost of these Silos

may be reckoned from the subjoined table of materials. In addition, a 100-ton silo requires 20 lb. clout nails and 56 lb. bolts and nuts. The contract price for the whole of the materials for the silo (15 feet by 21 feet), as per specification, including roof, was £20 16s. (December, 1905). This included red gum foundation posts, bolted together and tarred; studs bored for hoops and tarred for 3 feet up, and the battens for the three lowest hoops were also tarred; all materials loaded on truck at North Carlton Railway Station. A silo, 30 feet in diameter and 30 feet high (no roof), was erected at Adelaide Vale for £70. Another at Serpentine, 22 feet in diameter and 35 feet high (no roof), for £52. When more than 18 feet in diameter, it is handy to have a line of ports on opposite sides. More expensive silos lined on the outside of the studs in the American style (but which the writer considers unnecessary in our climate) are sometimes constructed.

The first is at Ryburne, Outtrim, 22 feet in diameter and 23 feet high. The superstructure is set on 5 feet of brickwork, cemented on the inside. The studs are 4-inch by 2-inch, covered on the outside with white pine weather boards rebated. Inside lining, one thickness ½-inch spruce, one layer P. and B. paper, and finally plain galvanised iron. Arrangements are made for the drainage of the concrete floor. The cost was £50.*

* These prices are based on the price of timber in Victoria.

Overground Silos.

Details of Dimensions, Capacity, and Materials Required.

Length of Trammel.	Inside Diameter.	Height.	Capacity.	Studs.	Battens.	Iron.	Approximate Weight. 6 x 3 x 24 g. Black.	Approximate Weight. 6 x 3 x 24 g. Galvanised.
	Ft. in.	Feet.	Tons.			Sheets.	T. C. LB.	T. C. LB.
6 9	12 10	21	45	29	60—17ft. 6in. x ½	49	0 7 0	0 8 3
		24	56		66— ,, ,,	56	0 8 0	0 10 0
		30	80		78— ,, ,,	70	0 10 0	0 12 2
7 8	14 8	21	60	33	60—18ft. 6in x ½	56	0 8 0	0 10 0
		24	73		68— ,, ,,	64	0 9 16	0 11 2
		30	100		78— ,, ,,	80	0 11 44	0 12 1
8 7	16 6	21	76	37	80—17ft. 6in. x ½	63	0 9 0	0 11 1
		24	94		88— ,, ,,	72	0 10 32	0 12 3
		30	130		104— ,, ,,	90	0 13 0	0 16 1
9 5½	18 3	21	95	41	80—18ft. 6in. x ¾	70	0 10 0	0 12 2
		24	118		88— ,, ,,	80	0 11 48	0 13 1
		30	160		104— ,, ,,	100	0 14 32	0 17 3
11 4	22 0	21	135	48	100—18ft. 6in. x ¾	84	0 12 0	0 15 0
		24	165		110— ,, ,,	96	0 13 64	0 16 3
		30	230		130— ,, ,,	120	0 17 16	1 1 1
13 2½	25 9	21	190	57	90—20ft. 6in. x ⅞	98	0 14 0	0 17 2
		24	230		100— ,, ,,	112	0 16 0	1 0 0
		30	310		120— ,, ,,	140	1 0 0	1 5 0
15 0	29 5	21	270	65	108—20ft. 6in. x 1	112	0 16 0	1 0 0
		24	320		120— ,, ,,	128	0 18 32	1 2 3
		30	450		144— ,, ,,	160	1 3 0	1 8 3

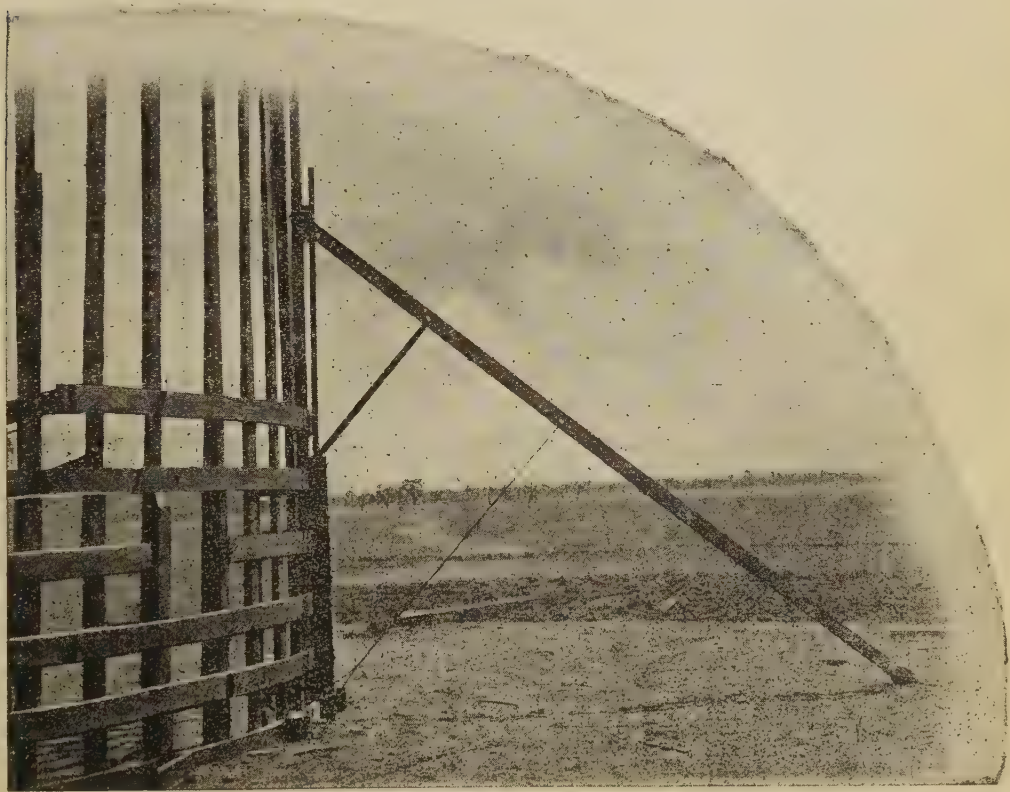
Notes on Building the Silo.

The foregoing directions should be followed out to the letter, as every point has been emphasised by the experience obtained in erecting nearly a hundred silos of this type. The foundation posts may be made long enough to stand more than 3 feet out of the ground with advantage if the silo is intended to be more than 25 feet high. Round or split timber will do for the posts, but if these are used, it is necessary to adze the inside face exactly perpendicular, so that the triple hoops may be quite true. The upper edge of the third hoop from the ground must be exactly 2 feet 11 inches. This then allows an inch of the first row of sheet iron to show above this hoop, and thus riveting may be done with ease. The first port hole may be made level with the lowest hoop if it is intended to excavate below the surface of the ground at any time, as shown in the accompanying illustration; but if not, it is handier to make the first port 3 feet from the ground. The distance of 3 feet from one point to the next is not a disadvantage in practice, as when the silo is being emptied, as soon as the top of a port becomes visible, the silage is excavated from behind the door until it can be opened and the silage then raked down the slope towards this port, instead of being worked quite

level, as is recommended, for the next 3 feet. Should it be desired to fill the silo while it is being erected, there is no difficulty in doing so. The lining is commenced from the bottom and kept two rows of sheets ahead of the filling. The sheets should be painted before they are nailed up, and whitewashed as soon as the riveting is complete. This extra treading on the silage is an advantage, and there is also no difficulty about the scaffolding. In the ordinary way, a couple of 9-inch by 1-inch planks are used as a scaffold, resting on the hoops in succession as the silo is built, and the iron is nailed on, beginning from the top. Remember that each row of iron loses 1 inch from the lap, so that the top edge for a 21-feet silo is 20 feet 6 inches from the ground. It makes a neat finish to the top if an extra 6-inch by ½-inch board is nailed on the *inside* of the studs, so as to project 4 inches above the edge of the iron. If thought advisable, the whole of the materials may be tarred or painted before erection, and the iron should always be treated in this way, at least on the inside, to protect it against any acids that may be formed. As an additional safeguard, two or three iron ropes (the same as those used for stays) may be placed round the studs, say at 5 and 8 feet from the ground, and twitched up tight. This is advisable if the silo is 30 feet high, or in any height when the timber is not of first quality. In fixing the purlins for the roof, the edge of the studs hardly needs notching at all, the bolt being quite strong enough to hold them together. In very tall silos, where the foundation posts stand, say, 6 feet out of the ground, another triple hoop may be built as part of the foundation at this height, and in all cases when any of the lower hoops show weak parts (knots or gum veins) they should be strengthened by making them of a double thickness of 6-inch by ½-inch timber. The foundation hoops of silos above 25 feet in diameter are made of two thicknesses of 6-inch by 1-inch instead of three of 6-inch by ½-inch.

Staying the Frame.

A tall silo exposes considerable surface to the wind, and although the circular shape is the best to meet wind pressure, it is necessary to take precautions to keep it upright when empty. For this purpose stays are placed



at regular intervals round the sides. Three of these are sufficient for a small silo, four for one 18 feet in diameter, and six for the larger sizes. They may be made of a good sapling, or built of 4-inch by 2-inch, as shown in the illustration; or what is perhaps the best method, is to secure the frame by wire ropes (or six strands of fencing wire twisted together) to a good post 20 or 30 yards away. This allows the teams to draw in to the chaff-cutter without inconvenience."

Dr. Cherry concludes his very valuable paper by explaining how the silo may be subsequently enlarged by excavating the interior in a circle as large as the inner face of the posts, to a depth of 6 or 10 feet or more. This gives $4\frac{1}{2}$ inches clear all round, and allows of a brick lining. If the walls are good clay or slate reef, they may be made smooth enough without bricking, and in that case the diameter of the excavation is precisely the same as that of the finished silo, so that the inside face is perpendicular whatever the depth may be.

If lined with brick, the inside should be finished smooth with a good coat of cement. Remember, a narrow, deep silo is better than a broad, shallow one. Directions are given for filling the silo, for feeding the silage to live stock; crops suitable to the silo and stack silage are also touched on.

The above specifications are so clear that anyone handy with tools can build this class of silo himself. The cost of the materials also is not prohibitive, which is in itself a strong recommendation.

RHODES GRASS AND PASPALUM.

Mr. D. Macpherson, manager of the Biggenden State Farm, makes the following remarks on the respective merits of the above grasses, which have been successfully cultivated on the farm:—

I do not think a comparison of the two grasses should be made, each one seeming to be the complement of the other.

Rhodes grass can be cut for hay during the summer months and grazed during the winter.

Paspalum, on the other hand, does not make such good hay, and is more difficult to harvest; but, during the summer and autumn months, its carrying power is enormous; and, to get the best results from it, it must be stocked to its full capacity.

It follows, therefore, that if anyone had a paddock of each grass, Rhodes grass could be shut up for hay during the growing months, and the Paspalum could be stocked as heavily as desired. Then, when the Paspalum was not growing so quickly, the stock could be eased off it on to the Rhodes grass paddock, the carrying capacity of which during the winter would, I believe, be nearly, if not quite, equal to the Paspalum.

In an article on the cultivation of Paspalum in the August number of the Journal, I note that Rhodes grass is dismissed from consideration on account of its expense. This is hardly fair, as, owing to the prolific nature of the grass, anyone getting even one root properly established could the following year easily plant out an acre from it. The price of the seed is thus hardly likely to keep up, and as for roots I can supply them in almost any quantity at 2s. 6d. per 100, which is the price Paspalum roots were bringing less than two years ago.

To show how prolific the Rhodes grass is, last March twelve month I received a sample packet of the seed. From this I got only twelve plants. In fourteen months from time of sowing the twelve plants had thickly covered the half-chain block I had reserved for them, enabled me to distribute 3,700 roots, $1\frac{1}{2}$ lb. of seed, and sow another block of half an acre.

The Orchard.

SHOOTING AT THE CLOUDS AS A PREVENTION OF HAIL.

In the "Chronique agricole du Canton de Vaud," M. H. Dufour draws some conclusions on the actual position of the question of the protection of crops by gun fire.

In France the general opinion of agriculturists is favourable to a continuation of the struggle by means of gun fire and rockets. In Italy a large number of associations (with this objective) which existed years ago have disappeared, and those which remain are reconstructing themselves on a more solid basis. As a result of all observations made, it is shown if the firing of a cannon and the sending up of rockets have any value as against hailstorms, the effective action is not produced in all cases; hailstorms already formed and dispersing with great rapidity are not modified either by gun fire or rockets. On the other hand, these agents may prove efficacious if the firing precedes the formation of the storm or is coexistent with it, especially if the storm be local and takes a more or less prolonged time to gather. It appears that under these conditions the explosions cause a premature condensation of the watery vapour, so that the hailstones are not completely formed, but a fall of soft hail and abundant rain will be observed. Soft hailstones are often produced without any firing, still this appears to be one of the most frequent phenomena observed during the shooting.

The efficacy of gun fire as against hail can as yet be neither absolutely affirmed or denied. If this efficacy exists, the causes for it, probably numerous, are as yet badly understood, and one is consequently reduced to hypothesis.

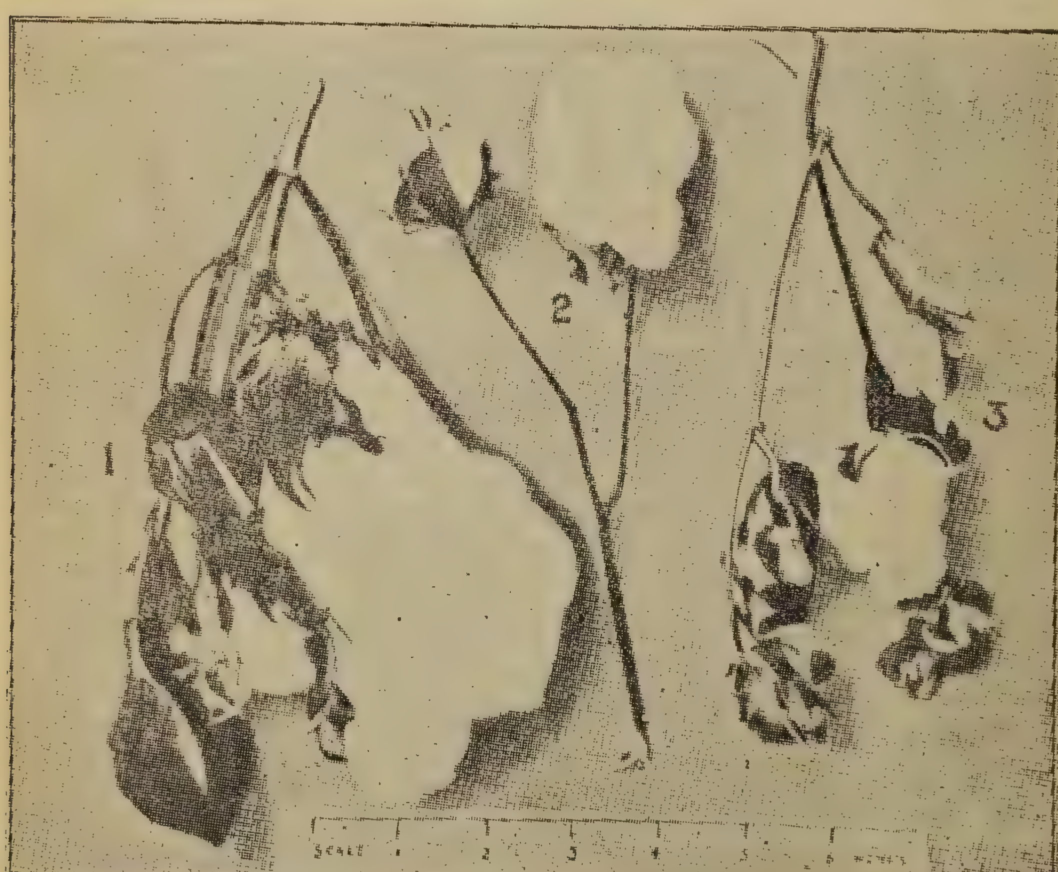
At all events, the efficacy of gun or rocket fire is only manifested in districts furnished with several firing stations forming a continuous network; isolated stations and individual fire of a few rockets or one or two guns are ineffectual; it is necessary, therefore, that, if the struggle is to be continued by means of guns, it should be organised with uniformity and method; isolation must be avoided, and the firing stations should be established according to the knowledge gained in each district of the path of the storms and of the manner in which they operate in different localities. For this purpose unanimity between counties is indispensable. In order to complete the actual organisation of the war against hail, it is of first importance to collect and consolidate as exactly as possible statistical information on the general direction taken by hailstorms and on their distribution over wide areas. The use of small cannons and feeble rockets must be abandoned; appreciable results can only be attained with heavily charged cannons and with rockets rising to a great height. The rocket fire, to be efficacious, must not be confined to a few, say to two or three, but the projectiles must be sufficiently numerous to produce a durable effect; for this reason, as in the case of cannons, the rockets are not weapons for individual defence, but the firing stations must be grouped and act together, and this means co-operative organisation.—"Revue générale Agronomique."

Tropical Industries.

QUEENSLAND COTTON.

Caravonica.

The persevering efforts of Dr. D. Thomatis, of Cairns, to produce a new variety of cotton which should at once yield heavy crops and also bring high prices in the British market, would appear from all accounts to have been crowned with success. Mr. Bottomley, who lately visited Queensland in the interests of cotton-growers, said, when addressing the Planters' Association in Fiji:—" Dr. Thomatis has, by crossing a long-stapled variety of the best cotton grown in Mexico with the Sea Island cotton of Peru, succeeded in producing a new variety of cotton, which he has called the Caravonica. The Mexican variety was chosen for its length, fineness, and gloss, and the Amazonian for its length and strength. The Manchester firms have pronounced it to be long, strong, and of regular staple, rather lacking in fineness. Of all the cottons collected by the association, the Caravonica was adjudged the most valuable, surpassing



a new variety crossed by the eminent Sir Daniel Morris, British High Commissioner for Agriculture in the West Indies. The Caravonica can be sold in any quantities in the home markets at 9d. per lb. The trees are large, and very prolific; the bolls large (70 to the lb.), containing $28\frac{1}{2}$ per cent. clean lint, and $71\frac{1}{2}$ per cent. seeds, which are black, and perfectly clear of floss. It is stated by Dr. Thomatis that one acre will produce 1,200 lb. of clean lint—a pheno-

Plate XX.

Cotton at Cairns.

Dr. Thomatis' Plantation of Caravonica Tree Cotton.

menal return—but I am not prepared to accept that as the probable yield, although I am quite satisfied that a very heavy yield may be anticipated. The Caravonica seed is very valuable, and is readily bought in Queensland at 10s. per lb. Orders for seed have been sent from the Soudan (Government House, Berber). It appears that it is intended to grow the Caravonica to a considerable extent on the plains irrigated by the Nile. Dr. Thomatis has three varieties of cotton—namely, the Caravonica, as originally produced by hybridisation; the New Caravonica, another cross between the Caravonica and the Kidney; and the Kidney seeded cotton itself. The idea of crossing these two varieties was to produce a finer, whiter, and silkier cotton than the Caravonica, and at the same time to disintegrate the group of seeds of the Kidney seeded cotton, and scatter them singly about the bolls, thus rendering the cotton easier to gin. I am pleased to say that all these results have been obtained. The bolls which I have seen are very fine and large, the seeds distributed, and the fibre long, white, and silky. Whilst I was at Caboni, Mr. Burness showed me the trees planted from the Caravonica seed which Dr. Thomatis had sent him, and I have no hesitation in affirming that all the qualities of the Caravonica are pronouncedly apparent."

Dr. Thomatis sent some seventeen bales of Caravonica cotton to England lately, and these were submitted for sale at the Liverpool Exchange on the 27th July by his agents, Messrs. Branker, Boxwell, and Co. The price bid was 11d. per lb. when Uplands was selling at from 4d. to 5d. and Sea Island at 9½d. per lb. The agents, not considering this anything like the true value of the cotton, withdrew it. We have since learnt that for the whole of the present standing crop Italian buyers have offered 1s. 3d. per lb., and the latest advice is that the crop has been sold at the Doctor's own price.

Three bales sent to the International Exhibition of Textiles (only) at Tourcarng, Roubaix, France, were, by desire of the French Government, opened, displayed singly, and encased in three glass frames and placed in the entrance hall, when photographs were taken and copies distributed to the visitors.

The Washington Bureau of Agriculture pronounced Caravonica to be the best of all varieties known, and the Government of India has exempted all lands cultivated with Caravonica from all taxes. It has there been practically demonstrated that the Caravonica crop pays over 5 per cent. net from the first maiden crop, and that at the local price of 5d. per lb.; but when the full crop is picked, and the price is based on the English valuation of 1s. per lb., Caravonica will pay over 200 per cent.

From the original 28 per cent of lint of three years ago, the Doctor says he has raised it to 45 per cent. of Caravonica II. (silk), and to 52½ per cent. of Caravonica I. (wool), and he is continually improving the strain as to proportion of lint in the bolls, especially in the Caravonica II. (wool), which seems to be the most improvable. Each tree will give from 5 to 15 lb. of bolls, and a good average is 8 lb. per tree. Every acre carries 900 trees, which means 7,200 lb. bolls per tree, or 3,600 lb. of lint per acre. This is an enormous return, practically 3,000 lb. more than an acre of cotton was ever known to produce. What we cannot clearly understand in the face of the reputed value of the cotton is, that Dr. Thomatis is buying seed cotton grown from seed supplied by him direct, at 4d. per lb., which gives the seller over £100 per acre.

The picking lasts from July to January.

As the growth of Caravonica cotton is very successful in India, Dr. Thomatis has donated about half a ton of his seed to the Indian authorities, to be distributed in small lots exclusively to the poor and deserving native ryots or farmers, and we learn that by the kindness of the Adelaide Steamship Company and the Orient Royal Mail Line the bags of seed were taken free from Cairns to India about a fortnight ago.

A NEW TOBACCO DISEASE.

R. S. NEVILL.

The following clipping from a Sydney paper has a special interest to the tobacco-growers in Queensland, and I strongly urge them to try the experiments herein suggested, first sterilising the soil by thorough burning. This is not the blue mould, as suggested by Mr. Dixson, but seems more nearly allied to the root rot of Sumatra. I had some correspondence with the United States Department of Agriculture in 1904 *re* blue mould, and they had not heard of it before, and asked for further particulars, which I furnished.

I have used formalin as a spray for infected beds, and as a dip for infected plants, without result, but it is worth while trying the experiment by saturating the plant beds well two or three days before sowing. I am convinced that the blue mould we see on the plant is more the effect than the disease, and we will have to use a preventive rather than a cure. At the State Farm I tried the growing of immune plants after the severe blue mould year of 1903, but was unable to develop the disease, in order to get proper plants; but I am convinced this is our only sure remedy for this trouble. The way to do this is to transplant from diseased beds or recovered plants, and by selection along this line for two or three years we may be able to secure seeds that are immune.

We have received the following communication from Mr. William Dixson, assistant managing director of the British-Australasian Tobacco Company Proprietary, Limited:—

The following article from "Tobacco Leaf" (America), of June last, should be of great interest to tobacco farmers:—

"East Hartford, 4th June.—Professor Archibald D. Shamel, of Hockanum, Physiologist for the Bureau of Plant Industry, Department of Agriculture, is looking into the matter of a disease which is attacking plants in a number of hot beds in North Granby, Simsbury, and Silver Lane. The attacking agent is the *Thiclavia basicola*, a fungus which acts on the top root, and was first described in 1899 by Professor A. R. Selby, in Germantown, O. The root turns brown or black, and the upper leaves become a very dark brown. The first report of the disease here was about 17th or 18th May. Since then Professor Shamel has heard of it in three or four localities, and from five or six different growers. The trouble is known as the black root rot. To combat the enemy Professor Shamel says that a solution of 1 part by measure of formaldehyde to 2,000 parts of water should be used. This should be sprinkled on the tobacco beds, and the soil should be sterilised thoroughly. The disease has been reported by Professor Shamel to Dr. Herbert J. Webber, who is in charge of the plant-breeding investigation of the Bureau of Plant Industry, with headquarters at Washington."

The disease would appear to be the blue mould in Australia, and we should recommend a trial of the remedy by farmers to whom the blue mould is only too well known to need description. Formaldehyde is in the ordinary preservative formalin, which contains 40 per cent., so that to obtain the proportion of 1 to 2,000 water mentioned in the recipe it will be necessary to add to every ounce of formalin 5 gallons of water, to be mixed as required.

The seed bed to be experimented upon should be thoroughly sterilised before planting by watering with the mixture, working it well, so that every part of the soil is treated. From our long experience and study of the disease, and the fungus appearing equally in virgin soil as on old cultivations, we are satisfied that climatic conditions have practically all to do with its appearance; a damp season being specially favourable to it. At Texas, Queensland, in 1903, they had rain up to December, and plants free from mould were only obtainable towards the end of the month, resulting in a poor crop.

Tumut, being a much moister climate, blue mould is always more or less in evidence. Tamworth and Bathurst, although having a little, are not so bad. Ashford, Inverell, is a new tobacco district, and, so far, has escaped, but will sooner or later be visited, and should therefore be experimented with.

Blue mould makes its appearance when the seed bed plants are forming their second leaves—they turn yellow and sickly, and on examination the two bottom leaves show the fungus on the under side. When once a plant is attacked it never gets over it, and should not be planted out.

SISAL HEMP IN INDIA.

From the "Quinzaine Coloniale" we take the following on the cultivation of sisal in India:—

"It has been stated that the Agave would not yield the same percentage of fibre in India as in Central America, but the experiments made in Sylhet have proved the contrary. The first crops, which are always inferior in quality, were, from a newly established plantation, and valued at £20 to £30 per ton, and it may safely be concluded that as soon as the plantation is in full swing £35 per ton will be realised. At Sylhet one company has planted 1,000 acres, which means 1,000,000 plants at 1,000 per acre. Another company has planted 1,000,000 over 700 acres, or 1,450 plants per acre. The first of these companies, at Dauracherra, will work off the crop with the Tomella machine, which is in general use in Yucatan. The other, which is located at Baravora, will use the Todd machine, which is highly approved of in the Bahamas. . . . Besides these two societies there are five others at Buina, who are working on a much more modest scale.

Naturally, there is at present difficulty in procuring plants for these areas, but within a year or two, when the 4,000 or 5,000 acres planted at Sylhet are of an age to produce suckers, the area can be increased within five years to 12,000 to 15,000 acres.

It may be asked, what effect will be produced on the sisal hemp market by the yield of 15,000 or 20,000 acres. To this question an Indian commercial firm replies that the general trade has nothing to fear from the increased production. . . . The larger the area the less will be the expenses and the greater the profits."

NEW ZEALAND FLAX *(PHORMIUM TENAX).*

Extracts from a Paper by Joseph Knight in the "Victorian Journal of Agriculture."

This useful and most profitable plant has been brought most prominently before the Victorian public recently by a Mr. Tait, who has an invention which is said to be a new method of extracting the fibre. As an effort has been made to float a company to work the same, considerable inquiries have been made for particulars as to what the plant consists of.

It is somewhat surprising the confusion that exists in the minds of many as to what constitutes New Zealand flax, and flax produced from the plant *Linum usitatissimum.* These plants differ so widely that I think it is advisable to reproduce illustrations of each, so that they may be identified. As the Linum, which was dealt with in the last issue of the above Journal, is now favourably and well known in the State, and need not be further referred to, the only

object in writing this brief treatise is to place a few facts before those who may be interested in *Phormium tenax*. The plant is well known in Victoria, and may be seen growing in most of our gardens. It is the principal plant employed for filling up all new plantations along streets, as it is hardy and thrives well under most conditions.

The Agave varieties, which produce the well-known Aloe fibre, are also confused with the *Phormium tenax*. A specimen plant is shown in the accompanying illustration. It will be readily recognised, as many varieties may be seen growing in yards and elsewhere.

Nature of the Plant.

Sir James Hector, in his valuable publication on *Phormium tenax*, which has passed through several editions, gives the following description. I am also indebted to this publication for the illustration of the sections of the root-stalk and other information:—

L

"*Phormium tenax*, belonging to the ~~f~~ilaceous family of plants, was first mentioned as occurring in New Zealand by Captain Cook, who says: 'The country produced a grass plant, like flags, of the nature of hemp or flax, but inferior in quality to either. Of this the natives make clothing, lines, nets, &c.' Royle states that 'the leaves of the plant are perennial, hard, sword-shaped, and from 5 to 7 feet in length, with a flower-stalk rising 4 feet or

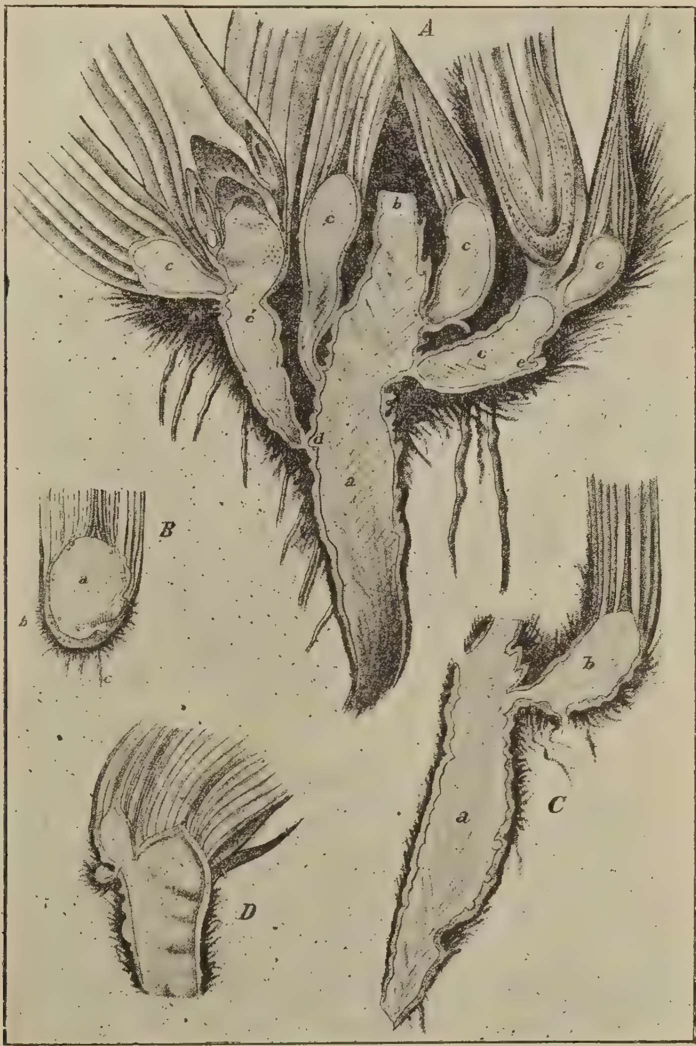
Plants of Phormium Tenax and Agave.

(The Agave is on the right side of the illustration.)

5 feet above them, and bearing a profusion of flowers, followed by triangular seed vessels, filled with flat and thin black shining seeds. It was introduced in the year 1798 into the South of Ireland, and has been found to flourish on the west coast of Scotland, though European winters are occasionally too severe for it.'

"This general description applies to the Phormium plant wherever it grows in New Zealand and Norfolk Islands, to which countries its natural range is confined; but it presents many minor variations in habit of growth, according to the climate and soil. These differences are not, however, so great as might be expected to occur in a succulent plant that ranges through 18 degrees of latitude, or from almost a tropical, insular climate to a country possessing a severe winter climate, with prolonged frosts and snowstorms."

The accompanying plate shows the sections of the root-stalk of the Phormium, illustrating the mode of growth and propagation:—A. Section or compound rhizome, or prostrate stem, of *Phormium tenax*, showing (*a*) main



STRUCTURE OF ROOT OF PHORMIUM TENAX.

axis, or central stem, from which a flower-stalk (the terminal axis of the plant) has been given off at *b*, *c*; lateral shoots forming new leaf-buds; and, ultimately, fans that accumulate nourishment at the base of their leaves, throw out rootlets, and finally become independent of the parent leaf, as at *d*; (*e*) first stage of buds from which lateral roots spring. B. Section of root of *Phormium tenax* in best condition for transplanting, showing—(*a*) Mass of fibrous, starchy, and resinous matter accumulated for the nourishment of the future flower stalk and lateral buds; (*b*) cortex layer, formed from the bases of the old leaves; (*c*) rootlets. C. Underground stem of manunu (one of the best varieties of *Phormium tenax*), showing—(*a*) Main axis that has flowered and completed its life; (*b*) lateral shoot by which the life of the plant is continued.

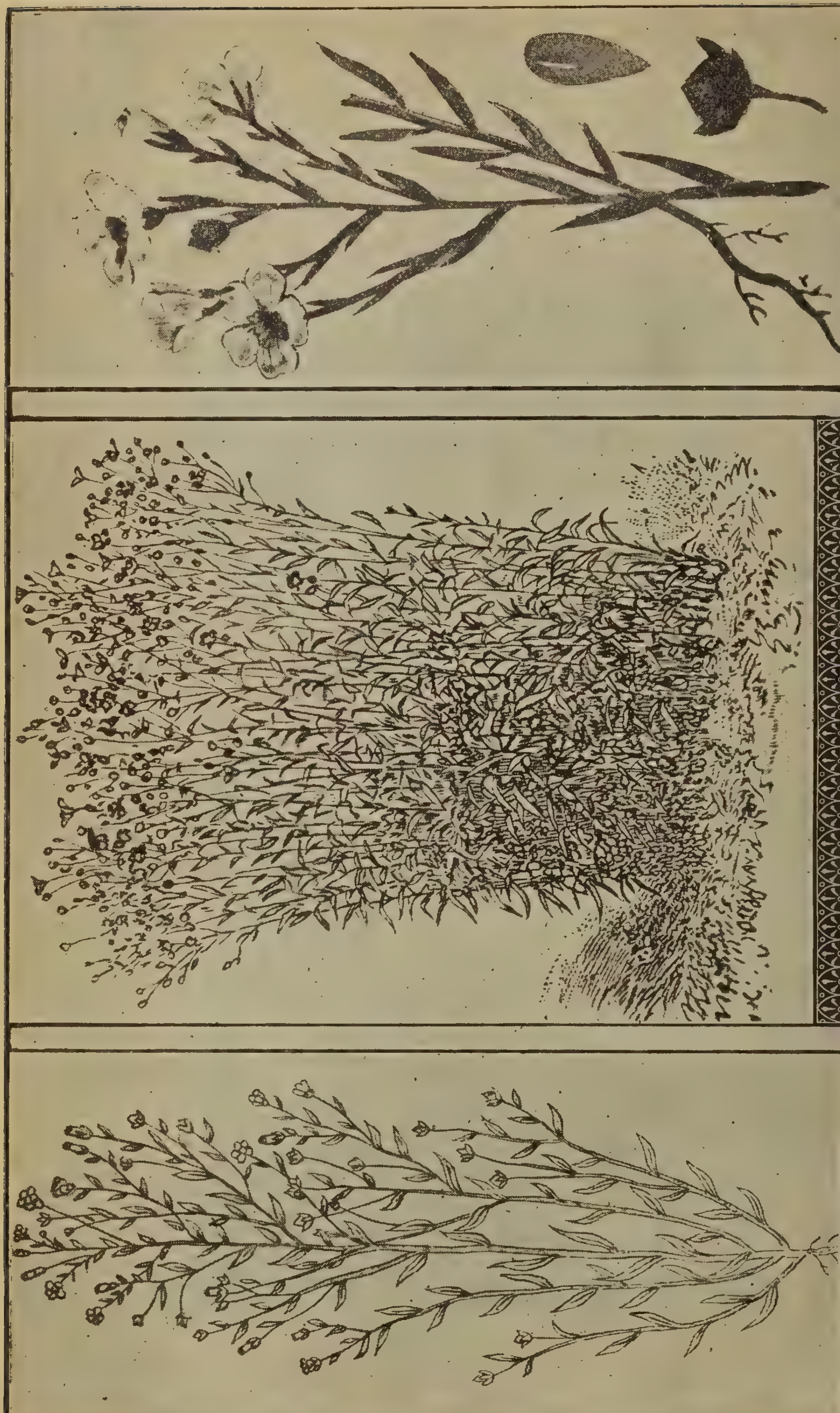


Fig. 1.—Flax Grown for Seed.

Fig. 2.—Flax for Fibre.

Fig. 3.—Flax Plant.

Flax Plant (Linum usitatissimum).

Class of Soil Suitable.

It would be difficult to say what soil this hardy plant will not thrive in, but there are certain conditions which it must have to be successful. There is one in particular—that is, sufficient moisture. It does not mean, as is generally supposed, that it wants a swamp or a running stream, but a humid

climate, so as to assure a constant and steady growth. In the dry, arid districts it will be found thriving well along the water channels, and where the soil is free it makes wonderful growth.

Much depends on the variety planted. The late Baron von Mueller describes both hill and swamp varieties.

Varieties should be selected to suit the soil and other conditions. My experience leads me to say that on the light-red chocolate soil in our highlands, where the rainfall is good, any of the hill varieties will make a growth fully equal to any described.

The same applies to light sandy or loamy soil where there is sufficient moisture, with drainage. The so-called swamp varieties will do well in a situation such as the banks of a running stream, or where the land is occasionally flooded, but will not thrive in low, stagnant pools. The best growth is made in reclaimed swamps, or where the swamp has been partly drained to the depth of 1 foot or so.

It cannot be too strongly impressed on the minds of those about to plant that the soil and the variety must be considered. There should be no difficulty in getting soil to suit the class of plants available. There are large tracts of country along the coast, portion of it covered with cut grass, and useless for any purpose. Much of this land, with proper treatment, would produce flax in abundance. This was recommended by the late Baron von Mueller over forty years ago, when distributing plants, &c., from the Botanical Gardens.

Phormium tenax is one of the most hardy plants introduced, and there is no difficulty in finding suitable soil in most parts of the State.

Propagation.

There are two methods by which plants may be provided—namely, "seedlings" and "division of roots." The division of roots, or stools, is that generally recognised as being the best.

The above illustration, copied from Sir James Hector's work, shows the root system of the plant, and sets forth at a glance how the divisions are to be made. A well-grown plant will give from 50 to 100 sets, and by careful selection the best quality of plants could be secured. This is most important to those about to plant in this State, as it is generally recognised

Bed of Seedlings Two Years Old.

in New Zealand that only a portion of the plants growing are of sufficient value, from a fibre-producing point of view, for the labour incurred in its extraction.

When planting from one set, as described above, none but such plants as are approved of should be set out. The testing of a leaf or so of each plant is extremely simple, and need not be referred to here; but if this precaution is taken, as I have already stated, nothing but suitable plants will be selected.

The second system is raising plants by seed. This takes a much longer time in bringing plants to maturity. Whilst it may be considered a reasonable thing to expect a cutting in a plantation when from three to four years old, it would take much longer with seedling plants.

The above illustration shows a bed of seedlings two years old, grown by the officer in charge of the gardens of the City Corporation, on the banks of the Yarra. His method of raising is simple, but effective. The seeds are sown in boxes; when they reach a certain stage they are potted out, and after remaining some time they are set out in beds, as shown in the illustration. As these plants are raised for ornamental purposes only, the methods adopted by him will not answer so far as selection is concerned.

It is well understood that when a number of plants of the same variety are grown together that the flowers become hybridised, and that the seedling cannot be regarded as characteristic of the parent. No doubt, it is a much less expensive way to secure plants; but where, as in this case, a plantation is made for almost all time, it will repay the selection of plants when planting.

To those who have isolated plants growing, and these of sufficient merit to warrant their use, the seeds may be used with safety; but where there is any chance of the plants becoming as described above, it would be unwise to adopt this course. I regret to say that in New Zealand, where this industry flourishes to such a large extent, very little attention is given to the selection of plants; although it takes a certain number of tons to produce a ton of fibre, it is recognised that by selection and cultivation the same weight of leaves will yield twice the amount of fibre. I cannot help thinking that in the establishment of an industry of this kind it is imperative that a thorough investigation should be made into the character and condition of the plants about to be set out.

Method of Planting.

There is nothing to guide us in this respect so far as plantations are concerned. The crops of *Phormium tenax* are generally self-sown, and in

Arrival of Green Leaf.

their natural state grow without cultivation, but the principle is similar to various other plantations which have to be worked by manual labour. The character of the soil will have much to do with distance and other arrangement. The plants, when full grown, spread out, covering from 4 to 6 feet in width, and whilst they would be kept in check to a certain extent by an annual cutting, the planting would necessitate allowing sufficient room for the plants to develop thoroughly.

The plantation of the Patea Flax Company was set out in rows 6 feet apart, and plants standing 6 feet between each other in the rows; but it is quite clear that where the land is suitable, and other conditions favourable, that the ground would be completely covered, and the plants become stunted from want of nourishment. If an additional 2 or 3 feet were left between the rows, it would allow for the working generally of the plantation.

It must be borne in mind that there is a great bulk of material to be taken from a plantation. The yield is said to be from 12 to 18 tons per acre, and to get this away it would be necessary to have roadways, as in vineyards, say, every ten rows, to gather up the bundles of leaves.

The previous illustration is taken from a New Zealand report on flax. It shows the haulage on the wheels. It will be easily seen that it would also be advisable to leave plenty of room for the vehicles to pass, or in many cases the plants would be damaged. The practice in New Zealand amongst the natives is to plant two or three sets in a hole. By this means, no doubt, an earlier return is secured, but it is questionable if the practice is advisable. When plants are somewhat difficult to get, it would be preferable to put in single plants, as their growth is rapid under favourable conditions, and in a short time the ground would be fully occupied. The set or sets are placed in a shallow hole, and the fibrous roots spread out when the earth is well tramped down. The depth of planting should not be more than 3 to 4 inches below the surface. The outside leaves should be cut back, but not the inner ones. This will enable the plant to become firmly established, when it will make a vigorous and healthy growth.

The advantages of a little care in planting, where both lines are kept, would considerably facilitate the after working. Phormium plants readily respond to thorough cultivation, especially in the earlier stages of their growth. In the case of planting trees, vines, &c., it is a great advantage to be able to cross-cultivate, and thereby keep the land in proper tilth. The wisdom of this has been generally recognised by orchardists and vignerons.

Time of Planting.

The most suitable season for planting is autumn, but when that is not convenient early spring may be adopted. With autumn planting, the sets become established by the heat retained in the soil, and will pass the winter over without suffering. Such plants may be also said to save a season's growth, as they are able to take advantage of the full spring season. But spring growth will answer equally well so far as the establishment of the plant is concerned.

The plant is an extremely hardy one, and will adapt itself to conditions where other plants would perish. In the establishment of an undertaking like this, it is advisable, where practicable, to have the soil thoroughly in order, and to plant out in early autumn.

Gathering the Leaf.

The plant consists of a number of shoots clustered together, each shoot producing a quantity of leaves, which strike up from the centre. The outside leaves, when not gathered, wither and die, and are of little value for fibre;

but, when gathered annually, they are cut off near the bottom, leaving two or three centre ones uncut. It is stated that those who adopt this system gather an annual crop from the same plants, and the plant itself makes a much more rapid growth. This is reasonable, as it is well known that any plant deprived of its foliage is checked in its growth for some time. But this system is not universally adopted; in some cases the whole plant is cut off at one time, centre leaves and all. These are sorted, or graded, at the mill before treatment.

Where there is a plantation which has been carefully planted out, it is well worth taking every care in preserving it; and by cutting the outside leaves of each shoot, and leaving the three centre ones, less check will be given to the growth, and an annual gathering will be secured. The leaves should be cut off just below where the green portion terminates, as the soft, thick parts do not work up well with the other portion of the leaf, and have to be recut at the mill before treatment. These, when cut, are bound up into sheaves of a size convenient to handle, and are carted to the mill, where they are sorted out ready for treatment.

The Yield.

The officials of the Department of Agriculture, New Zealand, state that, from uncultivated land, from 12 to 18 tons of green leaves per acre are gathered, but from a properly planted and cultivated plantation, according to experiments made, upwards of 50 tons could be gathered, and that the yield of fibre from carefully selected plants would be greater. According to the experience of various mills in New Zealand, it takes from 5½ to 6 tons of green leaves to make one of fibre.

There are various methods adopted in New Zealand of gathering leaves. It is usually from private land that they are obtained, and the owners claim a royalty; in some cases 12s. per ton is paid for the leaves as they are carted to the mill. The cost of cutting and binding is from 10s. to 12s. per ton. In some parts, where the mills are worked in the close vicinity of navigable streams, the green leaf is delivered at a cost of from 20s. to 25s. per ton.

If the yield of leaves is 12 tons per acre, this will give 2 tons of dressed fibre at £20 per ton	£40	0	0
Cost of leaves delivered at mill—12 tons at 22s. 6d. per ton ...	13	10	0
	£26	10	0

Extracting Fibre.

There are two methods of treating this product to extract the fibre—one by machinery, and the other by chemicals and machinery. The latter method has not been used to any extent, but is spoken well of by various writers. That the fibre can be extracted has been proved by me on various occasions. A firm in the city which has taken up the treatment of the Linum flax has produced good samples of fibre from the *Phormium tenax*. But the principal method of extracting the fibre is by machinery, and quite a number of various designs are in use in New Zealand. Most of these do good work. Recently the New Zealand Government gave a bonus for the encouragement of an improved machine, and considerable competition took place.

The commission appointed to examine into the merits of the various competitors have set forth the particulars of each in their report to the Hon. Minister of Agriculture, which is published in pamphlet form and distributed. This is interesting reading to those who contemplate dealing in any way with Phormium. As to the cost of machinery, much depends on the amount to be treated. Some mills are put up to produce several tons of fibre in the week, whilst others aim at smaller productions.

The power employed is an important item in giving the cost of a "treating plant." One capable of producing, say, 1 ton or so of fibre per week may be set down at from £150 to £200; this is complete, without the power. There are, according to an official publication, about 400 mills at work in New Zealand. Some are worked by water power, others by steam, but little can be said of the machinery from the information at present available.

From the experience gained in dealing with the production of the Linum flax, one of the most important features is to show that there is machinery available for its treatment when produced.

Varieties.

The following descriptions are taken from Sir James Hector's work:—

"*Harakeke* (Common Swamp Flax).—Leaves coarse, loose, drooping, points generally blunt; flower-stalk large, 11 feet to 14 feet high, and 1 inch to 2 inches in diameter; pod, short, erect. Grows almost everywhere, but attains its largest size (14 feet to 15 feet) on rich alluvial soil, by banks of streams. Many subvarieties are found, some with dark blue-green leaves above and glaucous below, and some pale olive-green or bronzy.

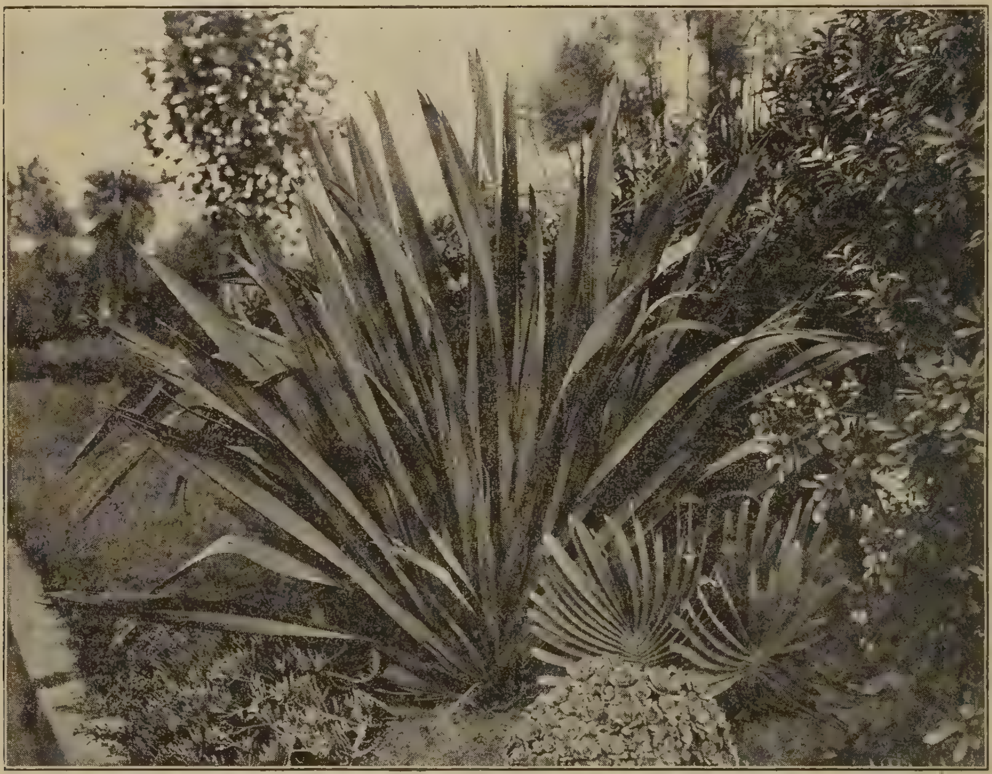
Common Swamp Flax.

Some varieties have also the butts of the leaves coloured with red for some distance up, while others are yellowish-green almost to the very base. When the plant is stunted, the flower-stalk is also small, and the best characteristic is the blunt point to the leaf.

Paretaniwha (Yellow Hill Flax).—Leaves erect, slightly drooping at the tip, yellowish-green, generally with red or orange margins, slightly glaucous below, point acute; flower-stalk small, 4 feet to 8 feet high, and ½ inch to 1 inch in diameter; pod, short, erect; fibre very good, soft and glossy. Plant seldom more than 5 feet or 6 feet in height; grows generally on clay hills.

Tihore.—Leaves stiff, erect, narrow, never drooping at the tip, olive-green, glaucous below; points very acute, or cupsidate, pink at the butt; flower-stalk, 9 feet to 10 feet high, and 1 inch in diameter; pod, erect or inclined. Seldom flowers, and still more rarely seeds. Plants seldom over 6 feet in height. Grows in rich, dry, alluvial land; never in swampy places. I have never seen it except where planted by the Maoris. I have here applied the name to that variety called "Tihore" by the Maoris throughout the Waikato, and which is probably identical with the "Oue" and "Tapato." It is best distinguished by its narrow, tapering, sharp-pointed leaves and erect, close habit. It grows so thickly together that I obtained 186 sets for planting from two bushes.

Phormium tenax that grows on high or dry ground, though smaller, is in general finer and more easily stripped than that found in swamps. Colonial rope-spinners prefer it, and are willing to give a higher price for it on this account."



Hill Flax

The above descriptions are somewhat difficult to follow, as far as identification is concerned. Unfortunately, no care has been taken to retain the names of the varieties introduced here. They have been planted indiscriminately, as they are for scenic effect only.

The illustrations show the variations in the system of growth. They represent plants growing on the St. Kilda road, which were planted by the City Corporation. No. 1 shows the drooping habit and coarse leaves referred to above, and, no doubt, if it were growing in its natural habitation—namely, on the water's edge, these features would be much more pronounced. No. 2 is typical of the hill variety, being erect, and hardier in its appearance. There are two varieties of variegated flax, but as to their value for fibre-production little is known of them here.

Profitable Nature of the Industry.

The Minister for Agriculture, the Hon. George Swinburne, M.L.A., when visiting New Zealand recently, gave this matter attention. He gives an

instance of one land proprietor receiving £9 per acre as royalty for the privilege of cutting leaves from his land. One instance is given in Sir James Hector's publication of 12s. per ton being paid as royalty for green leaves, so that, at the rate of 12s. per ton, and taking the yield at 15 tons per acre, this would give a return of £9.

These figures, possibly, are exceptional. Many instances are recorded of good returns being obtained from the yield of leaves without any effort on the part of the proprietor, and, with proper care in selecting the best varieties in planting, equal or better results could be obtained here.

The value of this industry may be estimated by the latest returns published of the imports of fibre and cordage into Victoria:—

Fibre, from all sources	£79,266
Cordage, binder twine, &c.	41,941
Total	£121,207

The exports of *Phormium tenax* from New Zealand totalled £730,803, of which the imports to Victoria of fibre amounted to £25,590, and of cordage and twine to £5,929. The average price of fibre exported from New Zealand during 1905 was £25 17s. 6d. per ton.

Conclusion.

In advocating the cultivation of this valuable fibre-producing plant, I feel confident that there is a great future for it, as the growing demand for this class of fibre is considerable. Binder twine alone would justify it being taken up in this State. But every care should be exercised in entering upon this industry, and none but the right class of plants secured, as a mistake in this respect would seriously retard its development.

Large tracts of suitable land are available for this purpose, and, beyond preparing, fencing, and planting, nothing further is needed, except an occasional stirring of the soil. Many of our capitalists, no doubt, would be prepared to take this matter up, if encouraged by some special condition by way of securing land for the purpose. The inquiries for information concerning this matter lead me to believe that something will be done in the way of planting before long, and it would be a mistake to neglect the best advice and assistance available.

We are much indebted to the Victorian Department of Agriculture for the loan of the blocks illustrating the above article.

Mr. Hargreave, lately a New Zealand flaxgrower, estimates the cost of producing 1 ton of fibre, ready for shipment at Wairoa, at £14. The selling price to-day in London is £34 per ton. Even at the lower price of £28 per ton, there is a fair margin of profit. Since 1902 all New Zealand flax is graded by a Government official. Mr. F. M. Bailey, Colonial Botanist, is of opinion, from his experience of the plant both in Queensland and in New Zealand, that the climate of Queensland would militate against its successful cultivation in this State. Intending planters would, therefore, do well to experiment at first with a small area of about 1 acre.

USE FOR POWDERED ALUM.

Finely powdered alum, as much as will lie on the point of a penknife, blown into the eye of a horse, cow, sheep, or pig, will remove any foreign substance, as chaff or grain of sand, &c. No case is hopeless, even when a layer membrane has grown over it. A complete cure is only a question of time. When the treatment is attended to early, one application is usually enough, but when of long standing it may be necessary to repeat the operation two or even three times a week, until recovery is established. If the eye should become inflamed, leave off for a week or ten days.

Plant Physiology.

SORGHUM POISONING.

In the Annual Report of the Government Entomologist and Vegetable Pathologist, 1905-6 [Report Dep. Agr., Qd., 1905-6, p. 71], reference is made under "Plant Physiology" to a memorandum described as "Theoretical considerations pointing to a possible preventive remedy in sorghum poisoning of stock, and as apparently yielding an explanation of certain anomalies in the hydrocyanic acid estimation with respect to different plant species or plant organs."

This memorandum is referred to as having been submitted by the writer thereof to the Agricultural Chemist, J. C. Brünnich (in June). The following is its text:—

In further reference to the sorghum poisoning of stock in Queensland, and to my suggestion that the fatality was due to an hydrocyanic acid yielding glucoside that had been found associated with the plant in Egypt, a suggestion shown by the researches of J. C. Brünnich to be placed on absolute fact, it may be pointed out that I have been long since led from theoretical considerations—the "law of mass action" especially—to further conclusions of apparently both scientific and practical interest.

These considerations alluded to suggest to me that, when the glucoside in question is accompanied by excess of the sugar that would be formed as one result of its hydrolysis, this hydrolysis will not ensue, and no hydrocyanic acid, therefore, will be yielded by it. Also, that the same may hold good with more than one form of sugar.

This hypothesis would explain many anomalous phenomena already observed by the chemist—*e.g.*, the variation in the amount yielded, to ordinary chemical processes of hydrocyanic acid estimation, by sorghum at different stages of its growth; the variations with respect to different portions of the same plant; and the absence of prussic acid even, in some instances. The hydrocyanic acid quotum varying inversely with that of the glucose sugar present, and attaining zero with this in large amount.

It would also follow from this hypothesis that, if sorghum were fed to stock already mixed with a suitable sugar (? glucose in molasses), or contained possibly a due proportion of sugar-yielding parts, no fatality would ensue. The course followed in this matter being similar to that in feeding sugar-cane "tops" (chop-chop) to horses; and the same might result from having glucose (molasses) in troughs accessible to stock feeding on the class of fodder referred to.

These successive conclusions, based on theoretical considerations as stated, commence, it may be pointed out, with one that admits of being confirmed or otherwise in the chemical laboratory.

In the meantime, it is not without interest to call to mind the fact that already, in January, 1903, Dr. S. Avery, Chemist to the Nebraska Agricultural Experiment Station, W.S.A., stated that "these carbohydrates (*i.e.*, glucose and milk-sugar) *retard the action of the enzym in liberating prussic acid,*" and that "*these facts* (alluding also to the tendency of prussic acid itself "to unite with certain carbohydrates," forming additional products "much less poisonous than the free acid"—H.T.) *suggest that*, in case the animal is not in

such a condition as to render medical treatment out of the question, *the following may be effective:*—A strong solution of glucose, which nearly every farmer has at hand in the form of 'corn syrup' or molasses, may be administered."*

Accordingly, it would be of interest to inquire if there be any further facts ascertainable by the chemist to confirm the hypothesis that appears to support such an important procedure in farm practices as that to which I have alluded.

HENRY TRYON,
Vegetable Pathologist.

[*Note.*—Forwarded to J. C. Brünnich, Agricultural Chemist, Department of Agriculture, Queensland, 2nd June, 1906, and accompanied by copy of the Nebraska *Bulletin* referred to therein.—H.T.]

"A very important discovery with regard to sorghum poisoning, which is due to a similar glucoside [referring to a hydrocyanic acid glucoside contained in sweet potato.—Ed.], was made by Dr. S. Avery, Chemist of the Nebraska Agricultural Experiment Station, who has shown that carbohydrates (sugars, as glucose, milk-sugar, and molasses) act as an antidote against the poisonous action of prussic acid and the prussic acid yielding glucoside [Bulletin No. 77 of the United States Agricultural Experiment Station: "Poisoning of Cattle by Common Sorghum and Kafir Corn"]. The presence of sugars in the first place retards the action of the enzyme in liberating free prussic acid; and, again, prussic acid unites with sugars to form less poisonous addition products. Dr. Avery recommends, therefore: to give to an animal suffering from sorghum poisoning, in a case that its condition still allows medical treatment, a strong solution of glucose syrup or molasses; or, again, a large quantity of milk. Actual experiments have shown that an animal could be given a large dose of pure prussic acid, up to three times the fatal dose, if glucose was given at the same time; the animal became very sick, but still recovered. Our farmers have, therefore, a very safe remedy in molasses from our sugar-mills, which, in many cases, is allowed to go to waste, although it is a very valuable fodder for cattle and horses. It can be, therefore, strongly recommended that, when green sorghum, sweet potato vines, or chaff made from these and similar fodders are fed, they should be sprinkled with molasses."—J. C. Brünnich, Agricultural Chemist. Annual Report of the Agricultural Chemist, 1905-6. (Ann. Rep. Dep. of Agr., Qd., 1905-6, p. 74.)

OLIVE OIL.

Medical authorities are all agreed as to the beneficial and remedial effects of olive oil, declaring it specially useful in any defects of the excretory ducts, or any low state of the system when in need of a tissue-building food. It has long been observed that those who use olive oil as a common article of food are generally healthier and in better condition than those who do not. It is said to be destructive to certain forms of micro-organic life, and for the eradication of such from the system it is frequently advised by physicians for internal use.

* Avery (S. Ph.D.) Poisoning of Cattle by Common Sorghum and Kafir Corn (*Sorghum vulgare*), Chemical Investigations. *Bull.* 77, *Agr. Exp. Station of Nebraska*, pp. 9-16, Lincoln, 1903.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE TOTAL RAINFALL FOR EACH MONTH OF THE YEAR IN THE AGRICULTURAL DISTRICTS OF QUEENSLAND.

STATIONS.	1905.					1906.							
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.
North.													
Bowen	0·06	4·03	0·05	3·91	0·04	12·84	8·73	6·29	0·78	6·34	0·69	0·04	0·36
Cairns	2·27	Nil	0·46	1·72	0·53	7·00	16·87	16·05	5·20	4·04	3·44	*2·28	1·79
Geraldton	3·88	Nil	0·22	5·44	1·14	15·61	37·67	19·67	11·51	7·93	16·05	5·73	6·65
Herberton	0·89	Nil	0·21	1·69	0·51	15·20	3·73	4·67	1·25	1·38	1·04	0·59	0·55
Hughenden	Nil	Nil	0·13	0·07	0·14	6·11	3·93	8·47	0·12	Nil	Nil	Nil	Nil
Kamerunga	2·16	Nil	0·63	1·05	0·33	7·25	13·76	14·93	4·94	4·13	3·55	2·49	2·03
Longreach	Nil	Nil	0·06	0·77	0·17	3·99	8·61	12·25	Nil	0·22	Nil	0·11	Nil
Lucinda	0·89	0·15	0·68	2·03	0·95	10·13	49·97	25·88	10·12	3·77	3·02	*0·40	†
Mackay	0·66	0·97	0·08	2·45	0·70	13·58	9·88	16·57	2·87	11·87	3·85	0·68	0·93
Rockhampton	0·51	0·70	0·91	1·05	4·77	4·24	15·31	8·26	Nil	5·27	1·12	Nil	2·61
Townsville	0·06	...	0·52	0·19	Nil	10·05	17·31	4·28	0·38	1·80	0·30	Nil	0·46
South.													
Barcaldine	0·04	Nil	0·15	1·49	1·30	4·00	7·07	13·84	Nil	1·70	0·19	0·10	Nil
Beenleigh	1·12	1·15	2·82	1·76	3·77	4·96	15·11	9·34	0·04	3·57	1·47	0·16	2·94
Biggenden	0·10	0·79	2·56	1·14	11·66	2·27	8·24	4·61	0·45	5·77	1·42	0·48	3·02
Blackall	0·04	Nil	0·29	1·45	0·83	5·13	11·14	11·99	Nil	1·75	0·22	0·48	0·02
Brisbane	0·65	1·32	2·22	3·63	8·21	4·16	12·71	4·85	0·45	3·23	1·38	0·22	4·21
Bundaberg	0·17	0·95	2·37	0·95	6·74	6·92	9·92	1·90	1·17	8·44	2·01	0·03	1·86
Caboolture	0·36	0·98	2·73	2·88	6·72	8·11	12·73	6·46	0·49	4·53	0·85	0·29	3·02
Charleville	0·14	0·09	0·99	0·68	0·12	1·29	10·66	3·15	0·07	...	0·13	2·34	0·35
Dalby	0·76	0·14	2·09	1·60	5·67	4·15	4·43	5·15	1·81	0·66	0·87	1·58	2·78
Emerald	0·30	0·29	0·64	4·41	0·80	6·12	7·81	5·22	0·08	2·12	0·17	Nil	1·62
Esk	0·57	0·65	3·21	3·65	5·98	5·49	6·79	9·04	1·74	3·25	0·77	0·38	4·51
Gatton College ...	0·27	0·54	2·59	3·59	4·73	3·75	5·33	9·43	1·40	1·90	0·60	0·41	3·73
Gayndah	0·25	0·30	2·38	1·93	5·58	2·81	9·65	5·86	0·51	5·10	0·48	0·22	2·34
Gindie	0·09	Nil	1·11	3·79	Nil	1·92	9·15	5·92	Nil	2·32	0·05	Nil	1·46
Goondiwindi	0·58	Nil	3·57	1·51	2·72	1·08	2·60	2·19	0·37	2·80	0·98	0·49	4·35
Gympie	0·70	1·85	1·48	1·44	5·03	6·07	7·38	5·58	0·45	6·88	2·26	0·52	3·19
Ipswich	0·78	0·70	2·91	3·32	3·64	5·30	7·22	3·87	0·12	1·67	0·25	0·17	2·59
Laidley	0·61	0·30	2·36	3·59	3·73	3·29	5·63	6·73	0·35	2·83	0·49	0·50	3·26
Maryborough	0·26	1·04	2·48	0·70	4·03	4·46	8·34	6·77	1·08	4·85	2·55	0·15	2·31
Nambour	0·83	1·62	4·70	0·85	5·37	7·01	16·50	9·35	1·13	6·20	3·68	0·61	4·52
Nerang	1·55	1·04	4·59	2·21	5·14	5·01	13·68	10·04	0 87	10·32	1·98	0·12	3·56
Roma	0·31	0·15	1·02	2·15	2·62	2·18	12·95	3·94	Nil	1·09	1·08	1·65	1·47
Stanthorpe	1·77	0·28	3·48	1·94	4·43	6·06	2·76	3·18	2·00	0·77	0·45	1·44	3·37
Tambo	0·46	Nil	0·85	1·57	0·39	5·09	9·05	10·63	Nil	0·66	0·05	0·67	0·07
Taroom	0·31	Nil	0·76	1·11	2·52	1·86	13·73	6·02	0·23	1·04	0·81	0·60	2·30
Tewantin	0·55	1·29	6·57	1·28	6·64	12·07	18·59	7·57	2·27	4·61	5·68	0·39	4·25
Texas	1·09	0·16	3·54	0·94	4·54	3·41	2·11	1·94	1·89	1·57	0·75	0·90	3·22
Toowoomba	0·66	0·61	2·59	2·09	3·20	6·17	6·58	8·87	2·07	2·65	0·85	1·81	3·63
Warwick	1·01	0·41	4·00	2·16	3·98	2·09	2·21	6·27	0·37	0·77	0·57	1·16	3·85
Westbrook	0·61	1·23	2·60	3·62	2·39	5·00	4·01	5·12	0·93	0·50	0·55	1·67	2·80

* From telegraphic reports—subject to alteration. † No reports received.

GEORGE G. BOND,
For the Hydraulic Engineer.

PRICES IN BRITISH MARKETS OF ARTICLES WHICH CAN BE PRODUCED IN QUEENSLAND.

BUTTER.—Australian: Unsalted, 106s. 6d.; salted, 100s. to 104s.; exceptionally, 110s.; Dalgety and Co. quote 76s. to 98s. for other sorts. New Zealand, 76s. to 101s.; Danish, 110s. to 112s.; Siberian, 88s. to 96s.; Argentine, 88s. to 94s.

CHEESE.—Canadian, 64s. to 68s.; New Zealand, 62s. to 66s.; Queensland (Glenmore), 60s. per cwt.

SUGAR (duties, raw, 2s. to 4s. 9d. per cwt.; refined, 4s. 2d. and ¼ per cent.).—Refined, £17 to £18 10s.; raw, £14 to £18 per ton; German beet, 8s. 5d. per cwt.

MOLASSES (duty, paid or allowed, 1s. to 2s. per cwt.; for agricultural purposes only, duty free).—5s. to 9s. per cwt.

RICE.—Real Carolina, £22 to £28; Rangoon, £8 5s. to £12; Japan, £13 to £17 10s.; Java, £16 to £20; Patna, £15 to £17 per ton.

COFFEE (in bond, duty 1½d. per lb.).—Ceylon plantation, 52s. to 120s.; peaberry, 50s. to 108s.; Santos, 37s. to 40s.; Jamaica, 100s. to 125s. per cwt.

CHICORY ROOT, DRIED (duty paid, duty 13s. 3d.)—24s. to 25s. per cwt.

ARROWROOT.—St. Vincent, 1¾d.; Natal, 5d.; Bermuda, 1s. 5d. per lb.

Maize, 23s. to 24s. per 480 lb.=2s. 10½d. to 3s. per bushel.

WHEAT.—Duluth, 31s. to 33s. per 496 lb.; English, 31s. to 33s. per 504 lb.; Australian, 30s. 3d. per 496 lb.

MALTING BARLEY.—29s. to 30s. per 448 lb.; grinding, 26s. to 27s. per 416 lb.

OATS.—New Zealand, 23s. to 25s. per 384 lb.

SPLIT PEAS.—43s. to 50s. per 504 lb.

GINGER.—Jamaica, 60s. to 81s.; Cochin, 40s. to 90s.; Japan, 22s. to 24s. per cwt.

VANILLA.—7s. 9d. to 9s. 6d., 7 to 7½ in.; 3½ to 6½ in., 3s. to 6s. 3d. per lb.

PEPPER.—Capsicums, bright red, 50s. to 57s.; mixed yellow, 50s.; chillies, bright red, 28s. to 30s.; mixed yellow, 21s. to 27s. 6d. per cwt.; black, 5¼d.; white, 7½d. to 8d. per lb.

RUBBER.—5s. 1¾d.; Ceylon "biscuits," 6s. 6d. per lb.

GREEN FRUIT.—Apples: Australian, 9s. 3d. to 12s.; Tasmanian, 11s. to 16s.; Tasmanian French crabs, 10s. to 10s. 6d.; Australian pears, 10s. to 22s. per case; bananas, 6s. 6d. to 12s. per bunch; pineapples, 3s. to 5s. each. Oranges, Valencia, per 420, common, 9s. to 11s. 6d.; medium, 12s. to 13s. 6d.; fine selected, 17s. to 20s.; choicest, 24s. to 34s. Lemons, Messina, per 360, ordinary to fine, 10s. to 11s.; finest selected, 16s. to 20s. per case.

DATES.—Tafilat, 30s. to 40s.; Egyptian, 18s. to 20s. per cwt.; Persian, 12s. to 16s. 6d. per case.

COTTON.—Uplands, Australian (Queensland), 6¼d. to 6½d.; Sea Island, 12d. to 15d.; Barbados, 18d.; St. Vincent, 19d. per lb.

COTTON SEED.—£6 11s. 3d. to £6 12s. 6d. per ton.

COTTON-SEED OIL.—Crude, £20 5s.; refined, £22 5s. per ton.

COTTON-SEED OIL CAKE.—£4 17s. 6d. per ton.

COTTON WASTE.—In 5 cwt. bag bales, 24s. to 34s.; discoloured, 18s. to 25s. per cwt.

LINSEED.—40s. to 41s. 5d. per qr.

LINSEED OIL.—£20 2s. 6d. to £20 7s. 6d. per ton.

LINSEED OIL CAKE.—£7 12s. 6d. to £7 15s. per ton.

OLIVE OIL.—£33 10s. to £39 per tun (252 gallons).

COPRA.—£21 5s. per ton.

COCOANUT OIL.—£31 to £37 per ton.

BEESWAX.—Australian, £8 10s. to £8 15s. per cwt.; Peruvian, £7 10s.

LUCERNE SEED.—58s. to 64s. per cwt.

CANARY SEED.—48s. to 95s. per quarter of 480 lb.=6s. to 11s. 10½d. per bushel.

HONEY.—Australian, 12s. to 18s. per cwt.; New Zealand, 23s. to 40s. per cwt.

MANILA HEMP.—£42 5s. to £43 5s. per ton.

SISAL HEMP.—Indian, £13 to £24 5s. per ton; Mexican withdrawn from sale in view of higher prices; nominal, £35. Sales of Queensland sisal were made in Melbourne during February and May, at £35 and £37 10s. per ton f.o.b. Brisbane. In our July issue Indian sisal was erroneously quoted at £34 to £36 10s., instead of £24 and £26 10s.

NEW ZEALAND HEMP.—£32 10s. to £34 per ton.

FOURCROYA (Mauritius Hemp).—£34 15s. 9d. per ton.

SANSEVIERIA (Murva or Bowstring) HEMP.—Bright, £40; dark, £35 per ton.

RAMIE.—£36 to £42 per ton. (Quotations for hemp are for best samples.)

ESPARTO GRASS.—£3 5s. to £5 5s. per ton.

JUTE.—£24 10s. to £28 15s. per ton. During the early part of last month a strong tone prevailed in the London market in sympathy with the advances in Calcutta, as prices improved 50s. to 60s. Latterly, the market has again risen.

DIVI DIVI.—£8 to £11 per ton.

TAPIOCA (duty, 5d. per cwt.).—2d. to $2\frac{1}{2}$d. per lb.; pearl, 21s. to 25s. per cwt.

EGGS.—French, 9s. to 9s. 6d.; Danish, 6s. 9d. to 8s. per 120.

BACON.—Irish, 67s. to 72s.; American, 53s. to 57s.; Canadian, 60s. to 67s. per cwt.

HAMS.—Irish, 86s. to 112s.; American, 62s. to 70s. per cwt.

PORK (frozen).—$5\frac{1}{2}$d. per lb.

TALLOW.—Mutton, fine, 31s. 9d.; medium, 29s. 3d.; beef, fine, 30s. 9d.; medium, 29s. per cwt.

POULTRY (Smithfield).—Surrey fowls, 2s. 6d. to 4s.; Lincolnshire fowls, 2s. 3d. to 3s. 6d.; Essex fowls, 2s. 9d. to 3s. 9d.; Irish fowls, 1s. 9d. to 2s. 3d.; feathered pigeons, 9d.; geese, 5s. to 6s.; ducks, 2s. 6d. to 3s. 3d.; turkey cocks, hens, English hares, no quotations; Australian rabbits, 13s. per crate; 5s. 6d. to 7s. 6d. per dozen; wild rabbits, 6d. to 9d. each.

FROZEN MEAT.—The following are the Frozen Meat Trade Association's Smithfield market quotations for the undermentioned classes of frozen meat, based on actual sales of not less than 100 carcasses of mutton or lamb, or twenty-five quarters of beef, of fair average quality. These quotations are not for selected lines, but for parcels fairly representative of the bulk of the shipments now on the market:—

New Zealand Sheep.

(Crossbred Wethers and Merino Ewes.)

	July 14.	July 21.
Canterbury, light (48 lb. to 56 lb.)	$3\frac{3}{4}$d.	$3\frac{3}{4}$d.
Canterbury, medium (56 lb. to 64 lb.)	$3\frac{11}{16}$d.	$3\frac{11}{16}$d.
Canterbury, heavy (64 lb. to 72 lb.)	$3\frac{3}{8}$d.	$3\frac{3}{8}$d.
Southland (56 lb. to 64 lb.) ...	None offering.	
North Island (56 lb. to 65 lb.), ordinary	$3\frac{1}{4}$d.	$3\frac{1}{4}$d.
North Island, best brands (56 lb. to 65 lb.)	$3\frac{3}{8}$d.	$3\frac{3}{8}$d.

Australian Sheep.

(Crossbred and Merino Wethers.)

Heavy (over 50 lb.)	$3\frac{1}{8}$d.	$3\frac{1}{8}$d.
Light (under 50 lb.)	$3\frac{1}{4}$d.	$3\frac{1}{4}$d.

River Plate Sheep.

(Crossbred and Merino Wethers.)

Heavy (over 50 lb.)	$3\frac{1}{8}$d.	$3\frac{1}{8}$d.
Light (under 50 lb.)	$3\frac{1}{4}$d.	$3\frac{1}{4}$d.

New Zealand Lambs.

Canterbury, light (28 lb. to 36 lb.)	5d.	5d.
Canterbury, medium (36 lb. to 42 lb.)	5d.	$4\frac{7}{8}$d.
Canterbury, heavy (42 lb. to 50 lb.)	$4\frac{3}{4}$d.	$4\frac{5}{8}$d.
Southland (28 lb. to 42 lb.) ...	$4\frac{7}{8}$d.	$4\frac{3}{4}$d.
North Island (28 lb. to 42 lb.) ...	$4\frac{13}{16}$d.	$4\frac{3}{4}$d.

Australian Lambs.

30 lb. to 40 lb., best brands (28 lb. to 42 lb.)	None offering.	
30 lb. to 40 lb., fair quality (28 lb. to 42 lb.)	$3\frac{7}{8}$d.	$3\frac{7}{8}$d.
30 lb. to 40 lb., inferior quality (28 lb. to 42 lb.)	None offering.	

River Plate Lambs.

28 lb. to 42 lb.	None offering.	

New Zealand Frozen Beef.

Ox, fores (160 lb. to 220 lb.) ...	$2\frac{3}{16}$d.	$2\frac{3}{16}$d.
Ox, hinds (160 lb. to 220 lb.) ...	$3\frac{1}{4}$d.	$3\frac{1}{4}$d.

Australian Frozen Beef.

Ox, fores (160 lb. to 200 lb.) ...	None offering.	
Ox, hinds (160 lb. to 200 lb.) ...	None offering.	

River Plate Frozen Beef.

Ox, fores (160 lb. to 220 lb.) ...	$2\frac{1}{16}$d.	$2\frac{1}{16}$d.
Ox, hinds (160 lb. to 220 lb.) ...	$3\frac{1}{8}$d.	$3\frac{1}{8}$d.

Queensland Timbers.—So much interest has been evinced in the Southern markets in our Queensland hard and soft woods, and the scrub timbers suitable for ornamental work and high-class furniture, that we strongly advise holders of land containing such timbers to refrain as much as possible from destroying them. Scrub timbers, such as yellow-wood, ivory-wood, red cedar, beech, hoop, Kauri and Bunya pine, crow's ash, silky oak, and many of the acacias, wil lall find a ready sale in the near future at remunerative prices. The same applies to the forest timbers—tallow-wood, swamp mahogany (for piles, unbarked), ironbark, grey, spotted, red, and other gums (excepting white gum), red stringy bark, &c. The great demand both locally and in South Africa for Queensland railway sleepers, bridge girders, and piles must result in higher prices, and those who are wise enough to preserve the timber on land not required for cultivation will find that timber pays better than corn. A demand has now arisen in Ceylon for satin-wood for railway sleepers. This timber, under the name of "light yellow-wood," is very plentiful both in the Southern and Northern tropical scrubs, and is now being destroyed wholesale by selectors. Following are some quotations for timbers in the British markets:—Satin-wood, in large logs, 7d. to 2s. per cubic foot. Rosewood, £7 to £12 per ton. Australian cedar, 3d. to 4d. per superficial foot. Kauri pine (in planks), 3s. to 3s. 6d. per cubic foot.

The Markets.

PRICES FOR FRUIT—ROMA-STREET MARKETS.

Article.	AUGUST. Prices.
Apples, Eating, per packer, Hobart	8s. 6d. to 12s. 6d.
Apples, Eating, per packer, Hobart, best sorts	12s. to 14s.
Apples, American, per packer	...
Apples, Cooking, per packer	7s. 6d. to 10s. 6d.
Apples, Local, per packer	...
Apricots, quarter-case	...
Bananas, per dozen (scarce, demand for local grown)	$2\frac{3}{4}$d. to $3\frac{1}{2}$d.
Bananas, per dozen	...
Cherries, quarter-case	...
Comquats, case	...
Lemons, per case, Local	3s. 6d. to 4s. 6d.
Lemons, per case, Imported	6s. 6d. to 7s. 6d.
Mandarins	3s. 3d. to 4s. 6d.
Mangoes, half-case	...
Oranges, per packer, Imported	...
Oranges, Local, per packer	2s. 6d. to 4s.
Papaw Apples, per case	5s.
Passion Fruit, quarter-case (scarce)	4s. 6d.
Peaches, quarter-case	...
Peanuts, per lb.	$2\frac{1}{2}$d.
Pears, Imported, per quarter-case	...
Pineapples (rough leaf), best sorts, per dozen	2s. to 3s.
Pineapples (smooth leaf), best sorts, per dozen	2s. to 4s. 6d.
Plums, Imported, quarter-case	...
Plums, Local, quarter-case	...
Quinces, Imported, per case	...
Rockmelons, per dozen	...
Strawberries, per tray	1s. to 2s. 6d.
Tomatoes, quarter-case	1s. 6d. to 3s. 9d.
Watermelons, per dozen	...
Cape Gooseberries, per quart	$3\frac{1}{2}$d. to 4d.

SOUTHERN FRUIT MARKET.

Apples, per case	to 18s.
Bananas, Queensland, per case	5s. to 6s.
,, ,, per bunch	1s. 6d. to 2s.
,, Fiji, per case	11s. to 12s. 6d.
,, ,, per bunch	2s. 6d. to 6s.
Chillies, per bushel	...
Lemons, per gin case	...
Mandarins, case	2s. 6d. to 9s.
Oranges, per case	2s. to 10s.
,, Queensland, per packer	2s. 6d. to 3s. 6d.
Passion Fruit, per case	to 15s.
Pineapples, case	5s. to 7s. 6d.
,, per double case	...
Rockmelons, case	...
Tomatoes, Local, case	4s. to 4s. 6d.
,, Queensland, per quarter case	3s. to 4s.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR SEPTEMBER.

Article.		SEPTEMBER. Prices.
Bacon (Pineapple)	lb.	6d. to 7½d.
Bran	ton	£4 10s. to £4 15s.
Butter, Factory	lb.	11½d. to 1s.
Chaff, Mixed	ton	£4
Chaff, Oaten	,,	£4 5s. to £4 7s. 6d.
Chaff, Lucerne	,,	£3 10s. to £6 10s.
Chaff, Wheaten	,,	£2 15s.
Cheese	lb.	6½d. to 7d.
Hay, Oaten	ton	£5 5s. to £5 10s.
Hay, Lucerne	,,	£3 10s. to £4 10s.
Honey	lb.	2d. to 2¾d.
Maize	bush.	2s. 6d. to 2s. 7½d.
Oats	,,	3s. 6d.
Pollard	ton	£4 10s. to £4 15s.
Potatoes	,,	£8 10s. to £11 10s.
Wheat, Milling	bush.	4s. 6d.
Wheat, Chick	,,	3s. 8d. to 3s. 11d.
Onions	ton	£8 10s. to £11 10s.
Hams	lb.	9½d. to 11d.
Eggs	doz.	5¼d. to 6d.
Fowls	pair	2s. 9¼d. to 3s. 11d.
Geese	,,	5s. 6d. to 6s. 3d.
Ducks, English	,,	4s. 4¾d.
Ducks, Muscovy	,,	3s. 10d. to 4s. 6d.
Turkeys, Hens	,,	6s. 11d.
Turkeys, Gobblers	,,	£1 4s. 10d.

ENOGGERA SALEYARDS.

Animal.	AUGUST. Prices.
Bullocks	£11 7s. to £12 10s.
Cows	£9 2s. 6d. to £10 15s.
Merino Wethers	27s. 3d.
,, Ewes	22s. 3d.
C.B. Wethers	25s. 3d.
,, Ewes	24s. 6d.
Lambs	18s. 6d.
Pigs (Porkers)	31s.

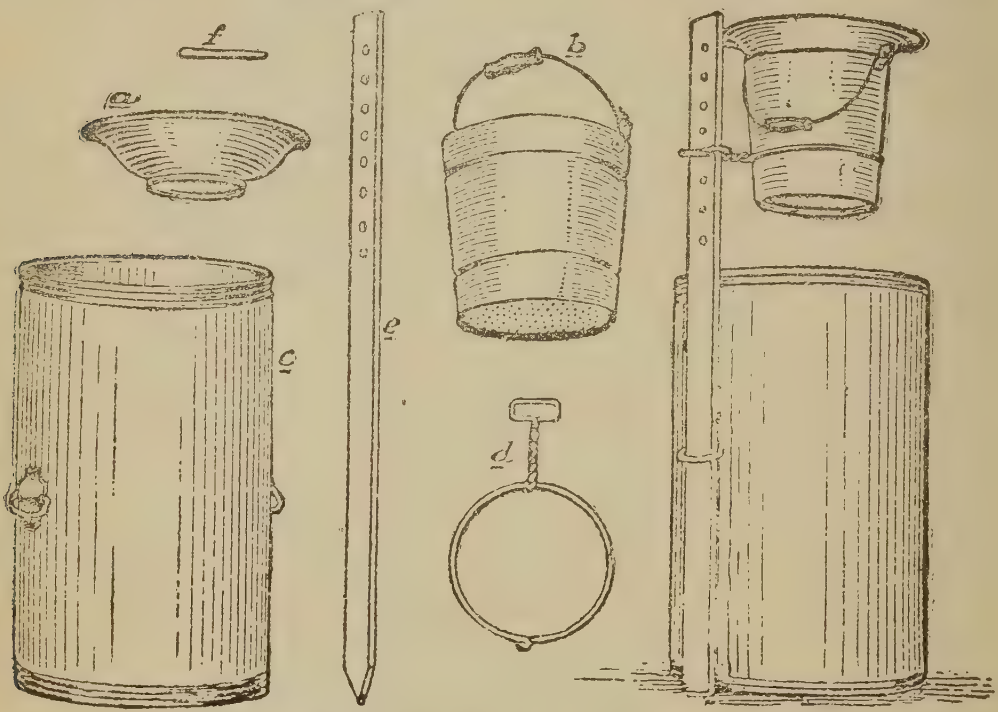
EXHIBITION.

Animal.	AUGUST. Prices.
Bullocks, Champion	£22
,,	£18
Cow	£12 15s.
Merino Wethers	23s. 6d.
,, Ewes	17s. 6d.
C.B. Wethers	30s.
,, Ewes	20s. 6d.

General Notes.

A HOME-MADE MILK ÆRATOR.

Professor Elliott, of America, says the whole process of ærating milk may be accomplished in a simple, efficient, and cheap manner with the articles pictured in the accompanying sketch. The left two-thirds of the illustration



shows the different parts of the ærator; on the right it is in position ready to receive the milk. The following is a description:—*A* is a common strainer; *b* is a common 8-quart pail, with numerous very fine holes in the bottom. These may be punched with a fine wire nail; *c* is a common milkcan of the cheese-factory type; *d* is a piece of wire twisted so as to form a loop at each end, one loop to fit loosely on the stick; *e*, the other loop, large enough to hold the 8-quart pail without slipping through; *e* is a straight stick of such size as will pass through the handle of a milkcan, and of such length, so that when the sharp end rests upon the ground the other end will reach 2½ feet above the milkcan. The top of this stick has numerous holes, about 3 inches apart. These holes are for supporting the pail at different heights, according to the force of the wind, so that the milk may not be blown over the top of the milkcan while the fine sprays are falling; *f* is a wooden pin or bolt to fit into the holes of *e*, to support the small loop of the twisted wire.

Place the stick through the handle of the milkcan till the sharp end rests upon the ground, then place the small loop of the wire over the stick, and put the wooden pin through one of the holes to prevent the wire slipping down. This done, place the 8-quart pail in the large loop, with the strainer on top of the pail, and our home-made combined strainer and ærator is ready for use. Now, as you finish milking each cow, pour her milk into the strainer. From this it falls into the 8-quart pail, and, running through the fine holes in the bottom, drops as a fine spray into the large milkcan. By means of this simple device three very important and necessary points are gained—the milk is strained, and thus freed from all coarse dirt, particles, and hairs; it is freed from cowy odours by means of the wind as it falls from the fine holes in the pail into the large milkcan; and, lastly, it is lowered in temperature.

GERANIUMS AS FOOD FOR STOCK.

Have any of our readers had any experience in the matter of geraniums for feeding stock? We understand that the plant thrives marvellously well in the Childers district, and that cattle and goats are extremely fond of it. It stands drought to a remarkable degree. The common Crow's Foot, itself a geranium, is one of the best stock foods in the Western country.

STUMPING LAND.

We learn from Mr. John Mahon, Principal of the Queensland Agricultural College, that a most successful exhibition of the work capable of being performed by the Trewhella Monkey Jack took place lately at Ma Ma Creek, in the Laidley district, in the presence of some fifty farmers and others interested in clearing land. All present were delighted with the work done. At the trial at the College the stumps extracted varied in diameter from 12 to 18 in., and the strongest were uprooted in 5 minutes by the aid of only one man. One of the farmers present informed the party that he had stumped 17 acres in less than 7 days. Mr. Mahon considers the implement a most valuable one, and that no farmer who has on hand such work as stumping, clearing land, lifting logs, or removing fences should be without one. A contract will shortly be entered into to stump 11 acres on Major Boyd's sisal hemp plantation, at the Broadwater, with the Wallaby and Monkey Jack, which did very expeditious work there a little while ago.

AGRICULTURAL AND HORTICULTURAL SHOWS.

The Editor will be glad if the secretaries of Agricultural and other Societies will, as early as possible after the fixture of their respective shows, notify him of the date, and also of any change in date which may have been decided on.

Answers to Correspondents.

GRAFTING ORANGES ON LEMON STOCKS.

G.Y., Proserpine.—

Lemon-trees can be worked over either by grafting or budding, the latter method being preferable. The trees should be cut back hard, and sufficient young shoots be allowed to grow to form the new head of the tree, and these young shoots should be budded with the desired kinds of oranges or mandarins. The common lemon is frequently used as a stock in New South Wales, and many of the citrus-trees in the Bowen district are worked on it. Apply to the secretary of the Bowen Agricultural Society, who will in all probability be able and willing to furnish you with scions of good oranges and mandarins, or, at all events, put you in the way of obtaining them.

SCRUB TICKS.

Tick Inquirer, Yandaran.—

The best treatment is to inject under the skin a solution of quinine. For a dog, a solution equal to 1 to 4 gr. of quinine; for a calf, 5 to 10 gr. Repeat in twelve hours if necessary. A chemist would prepare the solution.

PARALYSIS IN PIGS.

GRAZIER, Woodford.—

Mr. A. H. Cory, Veterinary Surgeon to the Department of Agriculture and Stock, advises:—

Paralysis in pigs is brought about by several causes—viz., rheumatism, worms in the kidneys and surrounding parts, and by overfeeding young pigs on an exclusive diet of corn and water.

Treatment.—If due to rheumatism, see that the pigs are housed at night in a dry place, and allowed to sleep on wood flooring instead of on concrete or earth. Give, daily, salicylate of soda 15 to 30 gr., and bi-carbonate of potash 1 to 2 drachms, in the food or as a drench.

If due to worms, I would recommend giving in the food or as a drench: One teaspoonful of oil of turpentine; liquid perchloride of iron, 20 drops; and raw linseed oil, 3 or 4 oz. This is sufficient for 50 lb. body weight. It should be given after the animal has been fasting for some hours, and can be repeated several times with an interval of three or four days.

When due to feeding, as mentioned above, stop the corn, and give once daily in a mixed diet or in milk 1 dessert-spoonful of the following powder for every 100 lb. body weight, after it has been well mixed and powdered:—Sulphur, 2 oz.; sodium bi-carbonate, 4 oz.; sodium sulphate, 2 oz.; black antimony, 2 oz.; sulphate of iron, 1 oz.; wood charcoal, 2 oz.

Farm and Garden Notes for November.

Why do so few farmers grow their own vegetables? This is a question that is frequently asked by visitors to the farming districts. The reason probably is that vegetables require a good deal of care and attention, which mean also a good deal of time taken from the ordinary farm work. In many cases it pays the farmer better to buy many kinds of vegetables than to grow them for himself. The only vegetables grown on many fine farms are cabbages and pumpkins, not to class potatoes under that head. Many people have an idea that European vegetables cannot be grown during the hot summer months, but this is a great fallacy. The Chinese gardeners supply the towns with all kinds of vegetables, except perhaps, cauliflowers, during the whole of the summer. It is, therefore, clear that, by constant work, plenty of manure, water, and some shade for seedlings, most vegetables can be produced during the hot months from November to March.

Field.—Under ordinarily favourable conditions, harvesting the wheat and barley crops may now begin. Those who have oats for hay should cut it when the grain has formed, but before it is ripe, for then the plant is in its most nourishing condition. Destroy caterpillars on tobacco plants, and top the latter so as to throw all the strength into the leaves. Keep down the weeds, which will now try to make headway; earth up any growing crops requiring the operation; sow maize, imphee, setaria, kafir corn, teosinte, sorghum; and plant sweet potatoes, sisal hemp, yams, earthnuts, ginger.

Kitchen Garden.—If your ground has been trenched or deeply dug and well worked, the advantages will be seen during the coming months. It does not pay to work shallow, dry ground. When sowing and planting this month, give plenty of room between the rows and the plants—otherwise they will be drawn up and worthless—and keep the ground open by constant forking and hoeing. Thin out melon and cucumber plants. It is a good plan

to peg down the vines. They will then not be blown about by the wind; they will take root at intervals, and thus help the main stalk. Give plenty of water to tomatoes planted out last month. They should also be mulched. Sow cabbage, French beans, melons, lettuce, radish, pumpkins, cucumbers, marrows, rosellas, &c., and transplant for succession in calm cloudy weather.

Flower Garden.—Stake any dahlias which may now be above ground. Plant out the bulbs which were stored in a moist place. If the weaker bulbs are reserved, they will come in for autumn planting. Take up all bulbs that have done flowering, and store in a dry place. Winter flowering plants will have gone off almost; still, the garden should be in full bloom, and will well repay the trouble bestowed on it; and a little fertiliser given as a top-dressing will assist the plants to bloom and look well for a longer time than if this were neglected. Give weak liquid manure to chrysanthemums, and allow no suckers to grow till the plants have done flowering. Take up narcissus. Do not store them, but plant them at once in new situations. Sow antirrhinum, balsam, zinnia, summer asters, summer chrysanthemums, calliopsis, and nemophila.

Orchard Notes for November.

By ALBERT H. BENSON.

The earliest varieties of sumer fruits will be ready to market during November; and, as this is the beginning of the season, I beg to call the special attention of every fruitgrower in the State to the importance of gathering and destroying all fly-infested fruits now if he wants to save any crop at all, as the neglect to destroy the first crop of flies will result in the loss of the succeeding crops of fruit. It is impossible to over-estimate the importance of destroying the early crops of fruit flies, as if left alone they breed so rapidly that the fruit crop is soon infested and destroyed.

The best way of destroying the first crops of flies is to gather and boil all infected fruit; such fruit, when boiled, to be fed to pigs or other animals. Feeding the fruit without boiling will result in the escape of a number of the maggots, and is therefore undesirable, besides being contrary to the Regulations of the Diseases in Plants Act.

During the month, the orchard should be kept well cultivated, especially in districts where the rainfall is light; and in such districts, if water is available for irrigation, a good watering should be given to all fruit trees and vines. By a good watering I don't mean damping the surface, but giving the soil a thorough soaking, as one good watering is worth a dozen small ones. Attend to the summer pruning of all young trees, removing any superfluous branches and pinching back all strong growths. Attend to the cultivation of the nursery; stake all grafts or buds, so as to produce straight, well-grown trees, the bud or graft being topped at the height that it is wished to form the head of the future tree.

Times of Sunrise and Sunset, 1906.

Date.	September.		October.		November.		December.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·3	5·33	5·29	5·47	4·59	6·5	4·46	6·28
2	6·1	5·34	5·28	5·47	4·58	6·6	4·46	6·29
3	6·0	5·34	5·27	5·48	4·57	6·7	4·46	6·30
4	5·59	5·35	5·26	5·48	4 56	6·8	4·46	6·31
5	5·58	5·35	5·25	5·49	4·55	6·9	4·47	6·31
6	5·57	5·36	5·24	5·49	4·55	6·10	4·47	6·32
7	5·56	5·36	5·23	5·50	4·54	6·10	4·47	6·32
8	5·55	5·37	5·22	5·51	4·54	6·11	4·47	6·33
9	5·54	5·37	5·21	5·51	4·53	6·11	4·48	0·34
10	5·53	5·38	5·19	5·52	4·52	6 12	4·48	6·35
11	5·52	5·38	5·18	5·52	4·52	6·12	4·48	6·36
12	5·51	5·39	5·17	5·53	4 51	6·13	4·48	6·37
13	5·50	5·40	5·16	5·54	4·51	6·13	4·49	6·37
14	5·48	5·40	5·15	5·54	4·50	6·14	4·49	6·37
15	5·47	5·41	5·13	5·55	4·50	6·15	4·49	6·38
16	5·46	5·41	5·12	5·55	4·50	6·15	4·49	6·38
17	5·45	5·42	5·11	5·56	4·49	6·16	4·50	6·39
18	5·44	5·42	5·10	5·56	4·49	6·17	4·50	6·39
19	5·43	5·43	5·9	5·57	4·48	6·18	4·50	6·40
20	5·41	5·43	5·8	5·58	4·48	6·19	4·51	6·41
21	5·40	5·44	5·7	5·59	4·48	6·20	4·51	6·41
22	5·39	5·44	5·6	6·0	4·47	6·21	4·52	6·42
23	5·38	5·44	5·6	6·1	4·47	6·21	4·52	6·42
24	5·37	5·45	5·5	6·1	4·47	6·22	4·53	6·43
25	5·35	5·45	5·4	6·2	4·47	6·23	4·53	6·43
26	5·34	5·45	5·3	6·2	4·46	6·24	4·54	6·44
27	5·33	5·45	5·3	6·3	4·46	6·25	4·54	6·44
28	5·32	5·46	5·2	6·3	4·46	6·26	4·55	6·44
29	5·31	5·46	5·1	6·4	4·46	6·27	4·56	6·45
30	5·30	5·46	5·0	6·4	4·46	6·27	4·56	6·45
31	...	...	4·59	6·5	...	...	4·57	6·45

Phases of the Moon.

Date	Phase	H.	M.
2 Sept.	○ Full Moon	9	36 p.m.
10 ,,	☽ Last Quarter	6	53 ,,
18 ,,	● New Moon	10	33 a.m.
25 ,,	☾ First Quarter	4	11 ,,
2 Oct.	○ Full Moon	10	48 a.m.
10 ,,	☽ Last Quarter	1	39 p.m.
17 ,,	● New Moon	8	42 ,,
24 ,,	☾ First Quarter	11	49 a.m.
1 Nov.	○ Full Moon	2	45 a.m.
9 ,,	☽ Last Quarter	7	44 ,,
16 ,,	● New Moon	6	36 ,,
22 ,,	☾ First Quarter	10	39 p.m.
30 ,,	○ Full Moon	9	7 ,,
8 Dec.	☽ Last Quarter	11	45 p.m.
15 ,,	● New Moon	4	54 ,,
22 ,,	☾ First Quarter	1	3 ,,
30 ,,	○ Full Moon	4	43 ,,

The approximate times for sunrise and sunset at Rockhampton, Townsville, and Cooktown may be obtained by *using the table for Brisbane, and adding* the following figures:—

	Rockhampton.		Townsville.		Cooktown.	
1906.	Rise.	Set.	Rise.	Set.	Rise.	Set.
September 1 to 22	9 m.	11 m.	24 m.	30 m.	27 m.	35 m.
,, 23 to 30	10 m.	10 m.	28 m.	26 m.	32 m.	30 m.
October ...	12 m.	8 m.	32 m.	22 m.	38 m.	24 m.
November ...	16 m.	4 m.	40 m.	14 m.	50 m.	12 m.
December ...	18 m.	2 m.	44 m.	10 m.	55 m.	7 m.

LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates.	
			1905.	1906.
Allora ...	Central Downs Agricultural and Horticultural Association	J. H. Buxton ...		
Allora ...	The Allora Farmers' Progress Association	P. Donovan ...		
Amby ...	Amby Farmers' Association	W. Jas. Sullivan ...		
Atherton ...	Barron Valley Agricultural, Pastoral, and Industrial Association	G. Bardon	5 and 6 July	4 and 5 July
Atherton ...	The Atherton District Farmers' Association	Fredk. Stewart ...		
Avondale ...	Avondale Farmers and Planters' Association	Edward J. Gayland		
Ayr	Lower Burdekin Farmers' Association	G. S. Mackersie ...		
Ayr	Lower Burdekin Pastoral, Agricultural, and Industrial Association	Philip Grout ...		
Ballandean ...	Lyra Farmers' Progress Association	M. B. Marlay ...		
Beaudesert ...	Logan and Albert Pastoral and Agricultural Society	A. Winship ..	20 June	8 May
Beenleigh ...	Agricultural and Pastoral Society of Southern Queensland	Wilson Holliday ...	15 Sept.	28 Sept.
Beenleigh ...	Logan Farming and Industrial Association	Wm. G. Winnett, Loganlea		
Biggenden ...	Biggenden Agricultural and Pastoral Society	C. J. Stephensen ...	6 and 7 July	5 and 6 July
Birthamba ...	New Hope Farmers' Association ...	G. W. Nixon ...		
Blackbutt ...	Farmers' Progress Association ...	John Dreghorn ...		
Boonah ...	Fassifern and Dugandan Agricultural and Pastoral Association	C. E. Mackenzie ...	17 and 18 May	6 and 7 June
Booyal ...	Booyal Farmers' Progress Association	Thos. Skillington ..		
Bowen ...	Pastoral, Agricultural, and Mining Association	Geo. Turner ...	11 Aug	17 Aug.
Bowen ...	Proserpine Farmers and Settlers' Association	R. Toogood ...		
Bowen (Proserpine)	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Bowen ...	Bowen Farmers and Fruitgrowers' Association	H. C. Smethurst ...		
Bowenville (Gordon Vale)	Moola Farmers' Progress Association	Alex. Gordon ...		
Brisbane ...	Horticultural Society of Queensland	F. W. Woodruffe ...	...	24 and 25 April
Brisbane ...	Queensland Acclimatisation Society	E. Grimley ..		
Brisbane ...	National Agricultural and Industrial Association of Queensland	Charles A. Arvier	8, 9, 10, and 11 Aug.	7, 8, 9, 10, and 11 Aug.
Brisbane ...	Queensland Nurserymen's Association	S. C. Matthews ...		
Brisbane ...	United Pastoralists' Association ...	Fredk. Ranson ...		
Brisbane ...	Queensland Chamber of Agriculture	F. W. Peek ...		
Brisbane ...	Queensland Citrus-growers' Asssociation	R. M. Cooper ...		
Brisbane ...	Combined Moreton Association ...	Wm. Ewart ..		
Brookfield ...	The Brookfield and Pullen Vale Farmers, Dairymen, and Fruitgrowers' Association	W. R. Moon ...		
Brooyar ...	Brooyar Farmers' Progress Association	E. Pike		
Buderim ...	Buderim Mountain Coffee and Fruitgrowers' Association	G. O. Burnett ...		
Buderim Mt.	North Coast Central Associatfon ...	James Lindsay ...		
Bundaberg ...	Bundaberg Horticultural and Industrial Society	H. E. Ashley ...		
Bundaberg ...	Council of Agriculture	H. J. Page ...		
Bundaberg ...	Woongarra Canegrowers and Farmers' Association	F. Watson ...		
Bundaberg ...	Bundaberg Agricultural, Pastoral, and Industrial Society	H. J. Page ...	14 and 15 June	26 and 27 Sept.
Burpengary...	Burpengary Farmers' Association ...	F. W. Uhlmann ...		
Byrnestown...	Byrnestown Farmers' Progress Association	Chr. H. Fredriksen		
Caboolture ...	Upper Caboolture Farmers' Association	Jos. Wilson ...		
Cairns ...	Aloombah Farmers' Association ...	N. P. Petersen ...		
Cairns ...	Cairns Agricultural, Pastoral, and Mining Association	J. Reid	7 and 8 Sept.	30 and 31 Aug.
Cairns ...	Cairns District Coffee-growers' Association	L. Battinson ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Cairns ...	Cairns District United Farmers' Association	Wm. Griffin ...		
Cardwell ...	Rockingham Progress Association ...	T. E. Fitzsimmons		
Charleville ...	Central Warrego Pastoral and Agricultural Association	G. M. Bell		
Charters Towers	Towers Pastoral, Agricultural, and Mining Association	A. H. Pritchard ...	31 May, and 1, 2, 3 June	31 May, and 1, 2 June
Childers ...	Isis Agricultural Association	H. Epps		
Childers ...	Doolbi Mill Branch, Isis Agricultural Association	W. T. H. Job ...		
Childers ...	Childers Mill Branch, Isis Agricultural Association	H. Epps		
Childers ...	Childers Pastoral, Agricultural, and Industrial Society	A. Eastaughffe ...	1 and 2 June	14 and 15 June
Childers ...	The Childers Mill Canegrowers' Association	A. Eastaughffe ...		
Clermont ...	Peak Downs Pastoral, Horticultural, and Agricultural Society	F. Leysley		
Clermont ...	Peak Downs Dairymen and Settlers' Association	A. G. Pursell ...		
Cleveland ...	Cleveland Horticultural Society ...	Miles R. Fox ...	14 Oct.	13 Oct.
Clifton ...	Darling Downs Pastoral, Agricultural, and Industrial Association	S. J. B. Just ...	13 Sept.	12 Sept.
Coochin ...	The Coochin Farmers' Progress Association	J. T. W. McLaughlin		
Cooyar ...	Yeraman Creek Farmers' Progress Association	George Seely ...		
Cooran ...	Cooran Progress and Agricultural Association	A. G. Bosanquet ...		
Cordalba ...	Cordalba Farmers' Association ...	J. Jeffrey		
Coulson ...	Coulson Farmers' Progress Association	G. R. Johnson ...		
Crow's Nest	The Crow's Nest Agricultural and Horticultural Society	James Gleeson ...	26 July	24 and 25 July
Croydon ...	The Gulf Mining, Pastoral, and Industrial Association	V. Creagh		
Cunnamulla	South Warrego Pastoral Association	J. Winward ...		
Dalby ...	Northern Downs Pastoral and Agricultural Association	E. Watt	26 and 27 July	25 and 26 July
Dallarnil Scrub, *viâ* Degilbo	Dallarnil Farmers' Association ..	Vincent H. Jones		
Danderoo ...	Danderoo Farmers' Progress Association	T. Campbe ...		
Deception Bay	Deception Bay Farmers' Association	B. J. T. Liscombe		
Degilbo	Degilbo District Farmers' Association	J. P. Laugher ...		
Dundowran, *viâ* Maryborough	Dundowran and Takura Settlers' Association	H. J. E. Tooth ...		
Esk	Esk Agricultural, Pastoral, and Industrial Society	Thos. C. Pryde ...	24 and 25 May	29 and 30 May
Eudlo ...	Eudlo Farmers and Fruitgrowers' Progress Association	Walter T. Jeremy		
Flagstone Ck., *viâ* Helidon	Flagstone Creek Farmers' Progress Association	James Scanlan ...		
Forest Hill ...	Forest Hill Agricultural and Progress Association	Wm. Jones ...		
Gayndah ...	Gayndah Pastoral, Industrial, Agricultural, and Horticultural Association	Thomas McMahon		
Geraldton ...	Johnstone River Sugar-growers and Manufacturers' Association	Ralph Reid ...		
Gin Gin ...	Currajong and Gin Gin Agricultural and Pastoral Society	J. R. Hamilton ...	24 May	28 May
Gladstone ...	Gladstone Pastoral and Agricultural Association	W. J. Manning ...		
Gladstone ...	Port Curtis Agricultural, Pastoral, and Mining Association	J. T. S. Brown ...		
Gooburrum, Bundaberg	Gooburrum Farmers and Canegrowers' Association	W. J. Tutin ...		
Goombungee	Goombungee Farmers' Association ...	Thos. Smith ...		
Goondiwindi	MacIntyre River Pastoral and Agricultural Society	E. T. Drake ...	...	1 and 2 May
Goondoon, *viâ* Bundaberg	Goondoon Farmers' Association ...	J. F. Cory		
Gracemere ...	The Gracemere District Farmers and Progress Association	Arthur E. Fisher ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued*.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Gympie ...	Agricultural, Mining, and Pastoral Society	F. Vaughan ...	13 and 14 Sept.	15 and 16 Aug.
Gympie ...	Chatsworth Farmers' Progress Association	W. Allen		
Gympie ...	Deep Creek Farmers' Progress Association	H. Bath		
Gympie ...	Gympie Horticultural Society ...	Charles Brasch ...		
Gympie ...	Imbil Road Farmers and Settlers' Progress Association	D. J. O'Farrell ...		
Gympie ...	Woondum and Brisbane Road Farmers' Progress Association	Chas. E. Gambling		
Hambledon (Cairns)	Hambledon Planters' Association ...	W. L. Hawkins ..		
Harrisville ...	Harrisville Farmers' Progress Association	W. J. Burnett ...		
Haslemore, Victoria, Herbert Riv.	Herbert River Farmers' League ...	Alfred Henry ...		
Hatton Vale	Hatton Vale Farmers' Progress Association	P. Sharry, junr. ...		
Headington Hill	Headington Hill Farmers' Progress Association	J. E. Stehn ...		
Helidon ...	Helidon Scrub Farmers' Progress Association	James Sweeney ...		
Helidon ...	Monkey Creek Farmers' Progress Association, Withcott, Helidon	Thomas Turner ...		
Hendra ...	Nundah Agricultural, Horticultural, and Industrial Association	Geo. A. Patullo ...	28 Oct.	13 Oct.
Herbert River	Halifax Planters' Club	A. Campbell ...		
Herbert River	Macknade Farmers' Association ...	Edwin S. Waller ...		
Herbert River	Ripple Creek Farmers' Association ...	J. W. Grimes ...		
Herbert River	Fairford Farmers' Association ...	D. G. Scott ...		
Herbert River	United Farmers' Association ...	D. G. Scott ...		
Herberton ...	Mining, Pastoral, and Agricultural Association	John M. Hollway	...	22 and 23 May
Hodgson ...	Hodgson Farmers' Association ...	Fred. Warner ...		
Home Creek, *via* Wondai	Home Creek Farmers' Progress Association	A. Iker		
Hopetoun ...	Hopetoun Pastoral, Agricultural, and Progressive Association	John Walsh ...		
Hughenden ...	Hughenden Pastoral and Agricultural Association	H. G. McLean ...	19 and 20 June	
Ingham ...	Fairfield Farmers' Association ..	B. Lynn		
Ingham ...	Gairloch Farmers' Association ...	B. Lynn		
Ingham ...	Herbert River Pastoral and Agricultural Association (Agricultural Show)	P. J. Cochrane ...	8 and 9 Sept.	
Ingham ...	Stone River Farmers' Association ...	F. A. Rankin ...		
Ingham ...	Victoria Farmers' Association ...	W. C. S. Warren...		
Ipswich ...	Ipswich and West Moreton Agricultural and Horticultural Society	P. W. Cameron ...	...	11 Oct.
Ipswich ...	Queensland Pastoral and Agricultural Society	J. McGill	14 and 15 June	20 and 21 June
Kelsey Creek *viâ* Bowen	Kelsey Creek Farmers' Progress Association	A. Fontaine ...		
Kolan, North	Kolan Canegrowers and Farmers' Association	Jas. H. Hendy ...		
Kilkivan ...	Kilkivan District Farmers and Settlers' Progress Association	J. H. McKewen ...		
Killarney ...	Killarney Farmers' Association ...	J. H Hansen ...		
Kingaroy ...	South Burnett Agricultural, Pastoral, and Industrial Society	T. J. Lacey ...	...	3 and 4 July
Laidley ...	Lockyer Agricultural and Industrial Society (at Gatton)	W. A. McIlwraith	13 July	4 and 5 July
Lakeside ...	Mungore Farmers' Association ...	C. C. Ridley ...		
Lillydale, Helidon	The Flagstone Creek Farmers' Progress Association	Danl. Ryan ...		
Longreach ...	Longreach Pastoral and Agricultural Society	J. P. Peterson ...	8 and 9 May	1 and 2 May
Lucinda Point	Victoria Farmers' Association ...	W. S. C. Warren...		
Ma Ma Creek, *viâ* Grantham	Ma Ma Creek Farmers' Progress Association	Joseph Turner ...		
Mackay ...	Agricultural, Pastoral, and Mining Association	F. Black		
Mackay ...	Pioneer River Farmers' and Graziers' Association	E. Swayne	7 and 8 June	20 and 21 June

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Mackay ...	The Mackay and District Horticultural Society	Fred. Bourne ...		
Mapleton ...	Fruitgrowers and Farmers' Progressive Association	W. J. Smith ...		
Mareeba ...	Mareeba Mining, Pastoral, and Agricultural Association	F. Cruckshank ...		
Maroochy ...	Bli Bli Farmers' Progressive and Industrial Association	H. A. Keil... ...		
Maryborough	Maryborough Horticultural Society...	H. A. Jones ...		
Maryborough	The Island Farmers' Progress Association	H. Simpson, junr.		
Maryborough	Wide Bay and Burnett Pastoral and Agricultural Society	A. H. Jones ...	19, 20, and 21 July	23, 24, and 25 May
Miriam Vale	Miriam Vale Farmers' Association	J. Spencer		
Montville ...	Montville Fruitgrowers and Farmers' Progress Association	C. J. Wyer ...		
Mooloolah ...	Mooloolah Farmers' and Fruitgrowers' Progress Association	G. S. Skerman ...		
Mooloolah ...	The United Progress Association, Caboolture, No. 1 Division	C. Court ...		
Mosman River	Mosman River Farmers' Association	Geo. W. Muntz ...		
Mosman ...	Mosman District Agricultural Society	G. W. Muntz ...		
Mount Cotton	Mount Cotton and Redland Bay Fruitgrowers and Farmers' Association	W. E. Burns ...		
Mount Mee...	Mount Mee Farmers' Association ...	Jas. H. Robinson ...		
Mount Morgan	Mount Morgan Agricultural, Pastoral, and Poultry Society	J. S. Lyle ...		
Mount Ubi, Eumundi	The Kenilworth Farmers' Association	Alex. Purdon ...		
Nambour ...	The Rosemount Association	George Etheridge		
Nambour ...	Dulong and Kureelpa Farmers' and Canegrowers' Association	A. A. Petrie ...		
Nambour ...	The Obi Obi Farmers and Dairymen's Progressive Association	A. D. Crichton ...		
Nanango ...	Nanango Agricultural, Pastoral, and Mineral Society	J. W. Sigley ...	12 and 13 April	9 and 10 May
Nanango ...	Coolabunia Farmers' Association ...	Ezra Horne ...		
Nanango ...	Malar Farmers' Association	A. Becker		
Nerang ...	Southern Queensland and Border Agricultural and Pastoral Association	H. J. Cooper ...	13 Oct.	14 Sept.
North Isis ...	North Isis Canegrowers' Association	T. E. Barnes ...		
North Pine ...	Moreton Agricultural, Horticultural, and Industrial Association	N. McKenzie ...		
Oakey ...	Oakey Agricultural and Pastoral Society	E. R. Pace		
Palmwoods ...	Palmwoods Industrial Fruitgrowers' Progress Association	H. Taylor		
Peachester, *viâ* Beerwah, N.C. Line	The Peachester Progress Association	R. G. Denny ...		
Pittsworth ...	Pittsworth Pastoral, Agricultural, and Horticultural Association	C. Longland ...	7 and 8 Feb.	31 Jan.
Pomona ...	Pomona Agricultural and Progress Association	H. Armitage, senr.		
Port Douglas	Port Douglas and Mosman Pastoral, Agricultural, Horticultural, and Mining Association	H. McMahon ...		
Port Douglas	Daintree Farmers' Association ...	J. Carlos Allen Donally		
Proserpine ...	Preston Farmers' and Settlers' Association	R. C. Dagg ...		
Proserpine ...	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Roadvale ...	Roadvale Progress Association ...	Henry Clark ...		
Rockhampton	Alton Downs Farmers' Association...	Thos. Thomasson...		
Rockhampton	Central Queensland Farmers and Selectors' Association	T. Whitely, Coowonga		
Rockhampton	Central Queensland Stockowners' Association	R. R. Dawbarn ...		
Rockhampton	Rockhampton Agricultural Society...	A. S. Tompson ...	16 and 17 June	20, 21, and 22 June, 1907

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Roma ...	Western Pastoral and Agricultural Association of Queensland	Angus McPherson	18 and 19 July	17 and 18 July
Roma ...	Yingerbay Farmers' Association ...	R. Frederick ...		
Roma ...	Roma Farmers' Association	Duncan Brown ...		
Roma (Blythedale)	Warooby Farmers' Association ...	S. S. Jones... ...		
Rosewood ...	Farmers' Club	P. H. Adams ...	6 and 7 Sept.	5 and 6 Sept.
Sandgate ...	Queensland Beekeepers' Association	A. H. W. Clarkson		
South Kolan	South Kolan Farmers and Planters' Association	John Whalley ...		
Southport ...	Southport Horticultural Society ...	E. Fass		
Spring Bluff	Aubigny Farmers' Progress Association	J. R. Torbock ...		
Springsure ...	Queensland Pastoral Society... ...	G. R. Milliken ...		
Stanthorpe ...	Border Pastoral, Agricultural, and Mining Society	Geo. Simcocks ...	9 and 10 Feb.	22, 23, and 24 Feb.
Stanwell ...	The Stanwell Agricultural Society ...	A. Spanner ...		
Stanwell ...	Stanwell District Farmers' Agricultural and Progress Association	W. Crowe		
St. George ...	Balonne Pastoral and Agricultural Association	T. M. Cummings ...		
Sunnybank ...	The Runcorn and Sunnybank Agricultural Society	S. Robertson ...		
Taabinga ...	The Taabinga Farmers' Progress Association	T. Pass		
Tannymorel, *viâ* Warwick	The Tannymorel Farmers' Progressive Association	Maurice Clifford ...		
Teutoberg ...	Teutoberg Farmers' Progress Association	E. M. Nothling ...		
Tiaro	Tiaro District Farmers' Progress Association	L. H. Riddles ...		
Tinana ...	Tinana Fruitgrowers and Farmers' Association	H. G. Habler ...		
Tingoora ...	Tingoora Farmers' Progress Association	Arthur Boisen ...		
Toowoomba...	Queensland Vine and Fruit Growers' Association	Hy. A. Tardent ...		
Toowoomba...	Royal Agricultural Society of Queensland	G. A. Leichney ...	1, 2, 3, and 4 Aug.	1, 2, and 3 Aug.
Townsville ...	Townsville Pastoral, Agricultural, and Industrial Association (formerly North Queensland Pastoral and Agricultural Association)	J. N. Parkes ...	6, 7, and 8 June	6 and 7 June
Upper Kedron	Upper Kedron Fruitgrowers and Farmers' Association	A. Marshall ...		
Upper North Pine	Upper North Pine Farmers' Association	J. Skerman ...		
Wallumbilla	Wallumbilla Farmers' Association ...	Edmund H. Yates		
Warren Siding	The Stanwell United District Farmers' Union	G. N. Terry ...		
Warwick ...	Eastern Downs Horticultural and Agricultural Association	F. H. Selke ...	15 and 16 Feb.	13, 14, and 15 Feb.
Wellington Point	Wellington Point Agricultural, Horticultural, and Industrial Association	Louis Hugonin ...	15 July	14 July
West Haldon, *viâ* Greenmount	West Haldon Farmers' Progress Association	A. E. Ayris ...		
Wondai ..	Mondure Farmers' Progress Association	W. E. Horne ...		
Woodend ...	Warren-Woodend Farmers' Club ...	W. Lehfeldt ...		
Woodford ...	Woodford Progressive Industrial Association	E. Heaton		
Woombye ...	Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society	P. S. Hungerford...	12 and 13 July	11 and 12 July
Woombye ...	Woombye Fruitgrowers' and Progress Association	E. E. McNall ...		
Wooroolin, *viâ* Nanango	Wooroolin Farmers' Progress Association	A. Deighton ...		
Yandina ...	Yandina-Maroochy Progress Association	Chas. Ablin ...		
Zillmere ...	Zillmere Horticultural Society ...	E. H. Decker ...		29 Sept

Public Announcements.

The Editor will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the Editor, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, covers in boards and cloth will be supplied from this office on application to the Under Secretary for Agriculture and Stock. Applications must be accompanied by a remittance of Sixpence to cover cost. For the convenience of those who are not within reach of a bookbinder, a Special Cover has been designed, which obviates the necessity for binding. These covers will be supplied at One Shilling each.

In order to avoid disappointment, correspondents who wish for replies to questions in the *Journal* are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

For the information of those who are desirous of communicating with the managers of State farms, we give their names and addresses below:—Queensland Agricultural College, Gatton, principal, J. Mahon; Westbrook State Farm, Westbrook, manager, C. Ross; Biggenden State Farm, Biggenden, manager, D. Macpherson; Hermitage State Farm, Warwick, manager, Alexander Martin; Gindie State Farm, manager, R. Jarrott; Kamerunga State Nursery, Cairns, manager, Howard Newport; Roma State Farm, manager, R. Soutter; Botanic Gardens, director, J. F. Bailey.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

PURCHASE OF STOCK AND PRODUCE FROM THE DEPARTMENT OF AGRICULTURE.

Purchasers of Stock and Produce, Plants, Seed, &c., from the State Farms and Agricultural College are reminded that Sales from these Institutions are made for Cash only. Persons desirous of making purchases should, therefore, first ascertain the cost of whatever articles they desire to obtain, and remit the full purchase-money when sendiug an order.

HERMITAGE STATE FARM.

A number of FINE YOUNG TURKEY GOBBLERS are for SALE. For particulars, intending buyers are requested to communicate with the Manager, Hermitage State Farm.

QUEENSLAND AGRICULTURAL COLLEGE.

FOR SALE.

Pure-bred Pigs, all from imported stock, including Berkshires and Large and Middle Yorkshires.

PRICE:

Boars, £2 2s.; Sows, £1 1s., f.o.b. at Gatton Railway Station.

Orders for Pigs of the Yorkshire breed will be accepted upon the condition only that delivery will be given within a reasonable time after receipt of order; orders already received taking precedence.

POULTRY.

Brown Leghorns, cockerels, pullets, and hens.
Silver-grey Dorkings, cocks, cockerels, and pullets.
Old English Spangled Game, cockerels and pullets.
Plymouth Rocks, cockerels and pullets.
Minorcas, cockerels and hens.
White Wyandottes, cocks and hens; cockerels and pullets.
Silver-laced Wyandottes, cocks, hens, and cockerels.
Black Orpingtons, cockerels, pullets, and hens.
Buff Orpingtons, cockerels, pullets, and hens.
White Leghorns, cockerels, pullets, and hens.

Brown Leghorns, Silver-grey Dorkings, and Old English Spangled Game will be available in the course of the next two or three months.

Prices from 10s. each and upwards (f.o.b. Gatton).

Eggs of the above breeds available in season, 10s. per setting—nine guaranteed fertile. Should less than nine prove to be fertile, the infertiles will be replaced if returned carriage paid. This rule will be strictly adhered to.

Applications for Settings of Eggs, accompanied by Remittance, may be made to the Principal, Queensland Agricultural College.

There are at present no pure-bred Bulls for Sale; and, owing to the large number of orders booked, it will be some time before any are available.

The following Stud Animals are available for Service at the College Farm, at a charge of FIVE SHILLINGS for Ordinary and TEN SHILLINGS for Pure-bred Cows:—

Imported Shorthorn, Jersey, Holstein, Guernsey, and Ayrshire Bulls.

The following Bulls imported from Great Britain are also available for service, at a charge of 10s. per head for all cows:—

Ayrshire Bull, SPECULATION.
Shorthorn Bull, BURTON SPOT.

Sows may be served also at a charge of 5s. per head by imported Berkshire, Tamworth, and Yorkshire Pigs.

JOHN MAHON, Principal.

STATE FARM, WESTBROOK.

MAIZE AND PUMPKIN SEED.

STAR LEEMING MAIZE.

A Limited Quantity of Seed is now ready for distribution.

Price: Six Shillings per bushel, f.o.b., Westbrook.

The strain has been improved by careful selection, and the Seed is from the Centre of the Cobs only.

SILVER NUGGET PUMPKIN.

The Seed of this, the best of all Table Pumpkins, is also an excellent strain.

Price: Six Shillings per lb.

Both the above have been saved from isolated crops, no other varieties of maize or pumpkins being grown near them.

To expedite delivery, application should be made direct to the MANAGER, Westbrook State Farm, together with remittance to cover Cost of Seed and Freight.

COTTON SEED.

We have been requested to notify Cotton Planters that Messrs. J. Kitchen and Sons, Limited, are prepared to supply UPLAND COTTON SEED FREE for this year's planting, and that the firm will pay the railage on all Cotton consigned to them during this year and 1907. The railage which has been already charged to Cotton Suppliers will be refunded to those who have sent in supplies.

NOMINATED IMMIGRATION.

RESIDENTS OF QUEENSLAND

Desirous of Assisting their Friends or Relatives in the United Kingdom or other parts of Europe to EMIGRATE to Queensland, may procure full Information from any Clerk of Petty Sessions, or from the Immigration Agent, Brisbane.

The following shows THE SCALE OF PAYMENTS for Nominated Passages:—

Sex.	Between One and Twelve Years.	Between Twelve and Forty Years.	Above Forty and under Fifty-five.	Fifty-five and Upwards
	£	£	£	
Male	2	5	10	The full amount of Passage Money, £15 15s
Female	1	3	10	
Infants	Free			

By Authority: GEORGE ARTHUR VAUGHAN, Government Printer, William street, Brisbane.

VOL XVII

PART 5

AUDAX AT FIDELIS

QUEENSLAND

November, 1906.

The Queensland Agricultural Journal

For terms of Subscription
SEE PUBLIC ANNOUNCEMENTS.

F.C.Y.

Edited by
A. J. BOYD, F.R.G.S.Q.

VOL. XVII., PART 5. [Nov., 1906.

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THE

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ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY A. J. BOYD F.R.G.S.Q.

VOL. XVII. PART 5.

NOVEMBER.

By Authority:

BRISBANE: GEORGE ARTHUR VAUGHAN, GOVERNMENT PRINTER.

1906.

CONTENTS.

NOTICE.

Queensland Agricultural Journal.

It is hereby notified that the *Journal* will be supplied to all members of Agricultural and Horticultural Societies who do not derive their livelihood solely from the land, on payment, in advance, of an annual subscription of 5s., which will include postage. Schools of Arts will be supplied at the same rate.

Persons resident in Queensland whose main source of income is from Agricultural, Pastoral, or Horticultural pursuits, which fact should be stated on the attached Order Form, will receive the *Journal* free

ON PRE-PAYMENT OF 1s. PER ANNUM,

to cover postage.

To all other persons the annual subscription will be 10s., which will include postage.

All remittances should be made by postal notes or money orders, but where they are unobtainable stamps will be accepted, though the Department accepts no responsibility for any loss due to the latter mode of remitting.

For your convenience an Order Form is attached. A cross on each side of the Order Form indicates to the recipient that his subscription is again due.

Amount of one year's subscription should therefore be forwarded with Order Form, without delay, to the UNDER SECRETARY, Department of Agriculture and Stock, Brisbane.

All subscriptions received for the *Journal* after the seventh day of the month will commence with the month after that on which payment is received. Previous copies available will be supplied at 6d. per copy.

ORDER FORM.

To the Under Secretary, Department of Agriculture and Stock, Brisbane.

For the enclosed..please forward me THE QUEENSLAND AGRICULTURAL JOURNAL for One Year.*

Name..

PLEASE WRITE PLAINLY.

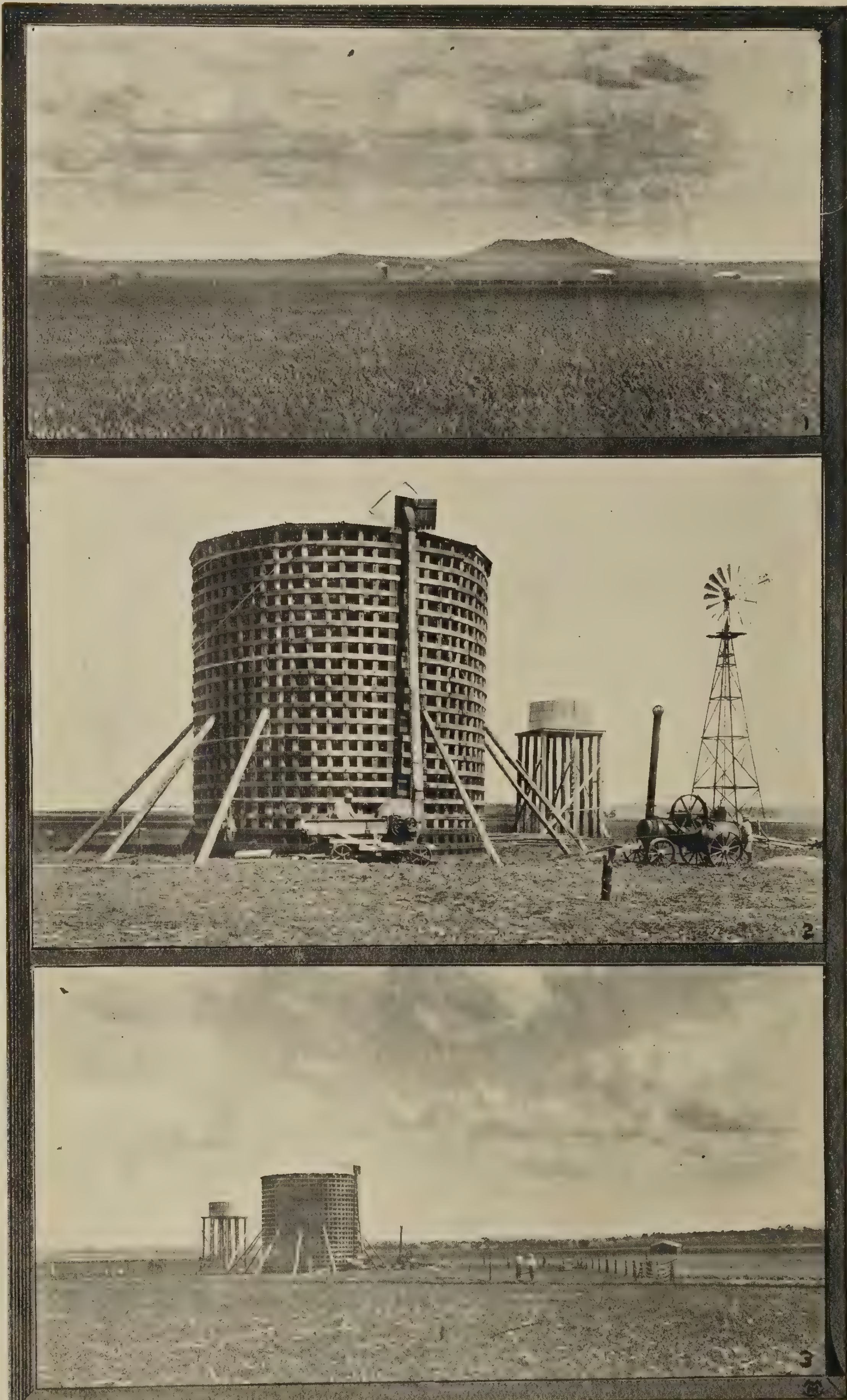
Address...

....

Occupation..

* State amount according to above rates.

Plate XXI.



A 600-ton Silo on the Darling Downs.

Agriculture.

SILOS ON THE DOWNS.

About 4 miles from Oakey, a pretty agricultural township 120 miles west of Brisbane, the traveller catches the first view of a very beautiful, fertile valley, surrounded by green hills, with Gowrie Mountain and Westbrook Creek on the left. Here is located the hospitable home of Mr. Ralph Clifton, called "The Towers," a house of modern build, beautifully situated on a ridge. The grounds are tastefully laid out with grassy lawns and flower beds. The site commands a fine view of 1,000 acres under cultivation in one unbroken stretch towards Westbrook Creek. The cultivation consists of 600 acres of lucerne, 200 acres of wheat, 100 acres of barley, and 100 acres of sorghum, whilst 100 acres are now being ploughed for rape. Next year Mr. Clifton proposes to lay down 300 acres more of lucerne. The whole of the land is subdivided into twenty-four paddocks, intersected by roads all leading to the newly-erected silo here depicted. The paddocks on one side are watered by Westbrook Creek, and on the other by means of pipes from 5,000-gallon tanks, erected on stands 23 feet high, as shown in the illustration. The water which supplies these tanks is drawn from bores sunk to a depth of about 25 feet.

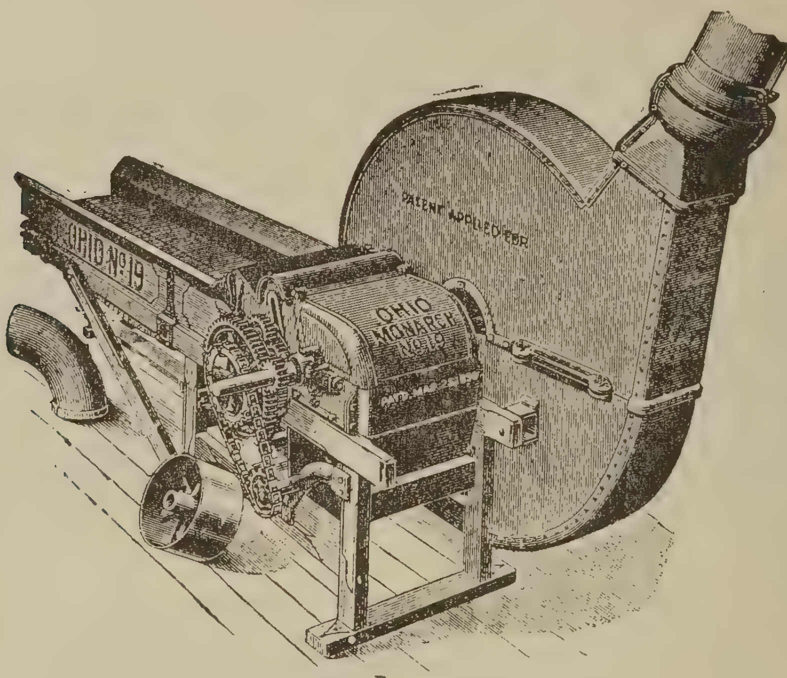
The silo is in the centre of the cultivation. It is built of brigalow staves, lined with 24-gauge sheet iron, coated with Ruberoid No. 3 paint. The strips round the structure are of 6 x 1 hardwood. The dimensions are 35 feet by 40 feet, and thus the silo will hold 600 tons of silage. Last May it was filled with chaffed sorghum, and this has resulted in a quantity of splendid fodder, sufficient to keep 4,000 sheep in good condition for six months. With additional rations of chopped straw and lucerne hay, 8,000 sheep can be fed for a similar period. The great value of the silage in this case is, that the sheep can lamb on it, and be in perfect condition all the time. Another thing is, that whilst all stockowners are aware that neither sheep nor cattle do well if fed entirely on lucerne hay and wheaten straw, dairy cattle will continue in good milk, and will give increased quantities of richer quality when these fodders are generously supplemented by silage.

Mr. Clifton proposes to build three more silos at Oakey, two having a capacity of 200 tons and the third of 100 tons. The large silo cost £140, and Mr. Clifton reckons that he can save from 33 to 40 per cent. of the original cost of such structures, which will be absolutely farmers' silos. These latter will doubtless be a good object lesson to other farmers who have as yet not risen to a conception of the enormous value and absolute necessity for such structures if they are to make a success of dairying. They are too often deluded into a false security, by a succession of magnificent seasons such as we have experienced of late years, but it should be remembered that it is absolutely certain that droughts will recur, and those without silos will be in the position of the foolish virgins mentioned in Scripture who omitted to supply oil for their lamps.

Not content with the large provision of silos, this enterprising and up-to-date farmer has three large silage stacks at Oakey. Two of these are of 300 tons each and one of 500 tons. The farms are few and far between where the owners have had the foresight to lay up a supply of some 1,700 tons of silage as a provision against the days of scarcity, which may possibly prevail even as early as next winter. It should be remembered that silage will keep good for years if properly stored in good airtight silos, so that if not required during any one year it will be all ready when green fodder or hay are unobtainable.

The silo on Mr. Clifton's farm is filled by means of an "Ohio" No. 14 self-feeding cutter, driven by a Marshall engine. The chopped material is driven up the elevator by means of a powerful fan or blower. Some idea of the blast

which is produced by this blower when it is stated by an eye-witness that a hayfork which escaped from the hands of one of the men attending to the machine was blown to the top of the elevator, a distance of 40 feet.



THE "OHIO" SELF-FEED ENSILAGE CUTTER WITH DIRECT-BLAST BLOWER ELEVATOR.

It should have been stated that the silo is furnished with twelve portholes, each 30 inches by 24 inches, for convenience of removal of the silage.

It is Mr. Clifton's intention to raise lambs for the English market, and we have little doubt that a man of such advanced ideas in farming and stock-feeding will make a magnificent success of his enterprise.

But it is not only at Oakey that he has formed such a splendid farm. He has about 5,000 acres at Warra, 60 miles farther west, on the railway line. Here there are already 400 acres of wheat and 200 acres of barley, and the land is now being ploughed for 200 acres of sorghum, 100 acres of panicum, and 100 acres of rape, whilst 1,000 acres will shortly be put under lucerne. Three silos are being erected here.

Mr. Clifton claims no originality for his methods or his silos, for, as he says, they are merely the adaptation of other men's ideas. We give him full credit for his modesty, but hold the opinion that when a man takes up other men's ideas, which may only be theoretical, and goes energetically to work to put them to a practical test, he is entitled to be considered an example to other more timid men, who are too afraid of spending a little money or too careless to try and improve their estate in the same courageous manner.

Mr. Clifton extends a cordial welcome to anyone who wishes to visit "The Towers." All he asks is that the intending visitor write to him previously or bring a card of introduction from the Department of Agriculture and Stock.

Our illustrations are from photographs taken at "The Towers" by Mr. H. W. Mobsby, artist to the Department of Agriculture and Stock.

MALTHOID BUILDING PAPER FOR SILOS.

The construction of silos has been constanty improving of late years, and we have risen from the stack to the pit, thence to the oblong or square single board form. This in turn gave place to the round stave or tub silo. The round form has unquestionably proved the best, owing, for one thing, to its

having no corners where air might lurk unsuspected. There are still many improvements being made in the construction of the round silo, the latest being that which was described in the last issue of the Journal. This is lined with sheet iron, painted inside to prevent the acids of the silage corroding the iron. This possible corroding has led people to think that iron should be done away with, and some other material substituted, such as "Ruberoid" or "Malthoid" paper. For the latter, the agents, the New Zealand Loan and Mercantile Agency Company, Limited, claim that it is an excellent material for lining the silo, because, whilst the building can be made perfectly airtight by its use, it is not at all affected by any of the gases, fumes, or acids evolved during the process of fermentation in the silo. If the silo is constructed as described in this Journal, with sides practically open, the Malthoid paper can be used on the inside without being fastened to the framework, being firmly held in position by the silage inside. It is said to be a splendid roofing material, and this has long been recognised by the Japanese, who, in rebuilding the seaport town of Dalny, near Port Arthur, used it extensively for roofing the new buildings. Through the hot Asiatic summer Malthoid roofing stands the torrid heat without cracking, expanding, opening, running, or blistering. The material remains unchanged whether during heavy tropical rains or mid-winter snows. It is made up in portable rolls 3 feet wide and 72 feet long. The New South Wales Department of Agriculture have used Malthoid and P. and B. Building Paper in the construction of some new silos. For further particulars, see the advertisement in this issue of the Journal. Full information will be supplied on application to the agents above mentioned.

WEATHER OBSERVATION.

By ALEX. MARTIN, Manager, Hermitage State Farm.

It is a remarkable fact, but none the less true, what little interest most of our farmers appear to take in studying the weather—its variations, indications, and influences on successful crop-growing. If a tour were made throughout the homesteads of our State, the visitor would rarely find a rain-gauge, let alone a barometer or a hygrometer.

Should a suggestion be made to the farmer that the installation of these little instruments might help him in carrying out the economy of his farm, he will in all probability endeavour to minimise their value by stating that you may find all this information in the local or Brisbane paper, forgetting that variation in rainfall is a very marked factor in our country; indeed, rainfall in individual falls nearly always varies considerably, even in regular, steady, continuous rains, and it may be safely said that variability is the rule.

In tests carried out it has been shown conclusively that great variations in rainfall often occur within quite limited areas; in fact, one portion of a farm, or even paddock, may receive 50 per cent. more rain than another, especially in the case of storm rains accompanied by wind, so that the farmer cannot take the reading from his nearest town to apply to his farm as well.

Would it not be better were he independent of outside information and in possession of his own records and observations?

It might be asked what difference it makes to the farmer whether he has these instruments or not—a knowledge of them cannot make his crops grow or bring rain when needed; but it should be understood that a systematic study of them, combined with a little experience, will often enable the intelligent farmer to use the conclusions arrived at to his advantage and profit.

The farmer has frequently as much need as the mariner to keep his eye on the weather, and so it becomes almost necessary for him to have some idea of the uses of such instruments as the barometer, thermometer, and possibly the hygrometer.

The uncertainty of the weather in our State, especially during seed time and harvest, is a subject which often puzzles the most conscientious man on the land, and at such times many references are made to the local "seer" or the weather-wise members of the community for the purpose of ascertaining the probabilities of the morrow being fine or otherwise; whereas a little skill in the use of the instruments referred to would enable him to predict with tolerable accuracy the probable changes of the weather.

On some farms one sometimes sees a milk-jug, a tub, or the inevitable empty jam-tin placed outside when rain threatens, in order to give the farmer an idea of the rainfall; but how he can arrive at anything like a correct estimate of the fall from these crude appliances is rather a mystery.

The outlay of a very small sum would purchase a small set of meteorological instruments quite sufficient to enable our friend to take his own readings and indications quite accurately.

For the occupier of a large farm it would be a good idea to establish rain-gauges at various points on the property, not necessarily many, but say one at the northern extremity, one at the southern, one at the western, and one at the eastern. By this arrangement he will be enabled to very soon find out which portions of his farm are favoured with the most rain.

In some tests of variation in rainfall extending over fifteen months of observation Mr. C. T. Musson, of the Hawkesbury Agricultural College, arrived at, amongst many others, the following conclusions:—

"Storm rains, especially when accompanied by winds, show a more or less graduated scale of fall, decreasing as the distance increases from the point of origin and from the storm centre. As the heavy subsoil-soaking rains are few and far between, whilst their effect is often soon lost, we must look to the more frequently occurring rains of medium amount as of the most use to plant growth.

"It is, therefore, a matter of the greatest importance that where rains are capricious for cropping purposes areas likely to catch the maximum amount of these surface rains should be selected for certain crops.

"In selection of ground for cultivation, therefore, situations should be chosen which not only give the most favourable circumstances in respect to soil but also of prospective rainfall. In a climate like ours everything should be considered. A chance fall will frequently save a crop, and we could often place a crop in such a position that it is likely to catch any such fall, but only if we know its probable track."

A very handy and useful barometer for country use is that known as "The Farmer's Barometer"—in fact, it contains three of the before-mentioned instruments in one. This instrument, which may be had from any reputable firm of weather instrument suppliers, consists of an upright tube of mercury inverted in a cistern of the same fluid. This is secured against a strong frame of wood, at the upper end of which is fixed the scale, divided into inches and tenths of inches. On either side of the barometer, or centre tube, are two thermometers. That on the left-hand side has its bulb uncovered and freely exposed, and it indicates the temperature of the air at the place of observation. That on the right hand has its bulb covered with a piece of muslin, from which depend a few threads of soft lamp-cotton; this cotton is immersed in the small cup situated just under the thermometer, this vessel being full of water. The water rises by capillary attraction to the muslin-covered bulb, and keeps it in a constant moist state.

These two thermometers, which are distinguished by the names of "wet bulb" and "dry bulb," form the hygrometer; and it is by the simultaneous reading of these two thermometers, and noting the difference between their indications, that the humidity in the atmosphere is determined.

The movable screw at the bottom of the cistern is for the purpose of forcing the mercury to the top of the tube when the instrument is being carried from place to place, and it must always be unscrewed to its utmost limit when the barometer is hung in its proper place. After this, it should never be touched.

The manner in which the hygrometer acts is as follows:—It is a well-known fact that water or wine may be cooled by a wet cloth being tied round the bottle and then being placed in a current of air. The evaporation that takes place in the progressive drying of the cloth causes the temperature to fall considerably below that of the surrounding atmosphere, and the contents of the bottle are thus cooled. In the same manner, then, the covered wet-bulb thermometer will be found *invariably* to read lower than the uncovered one, and the greater the dryness of the air the greater will be the difference between the indication of the two thermometers; and the more moisture that exists in the air the more nearly they will read alike. The cup must be kept filled with pure water, and occasionally cleaned out to remove any dirt. The muslin or cotton-wick should also be renewed every few weeks.

The hygrometer may be had separate from the barometer if the combined instruments cannot be sufficiently exposed to the external air, this being essential for the successful use of the hygrometer. This farmer's weather-glass then consists of three distinct instruments—the barometer, the thermometer, and the hygrometer. He has thus at his command the three instrumental data necessary for the prediction of the weather.

Some Rules for Predicting the Weather.

A rising barometer—

Rapid rise indicates unsettled weather.

Gradual rise indicates settled weather.

Rise, with dry air, and increasing cold in summer, indicates wind; and if rain is falling better weather may be expected.

Rise, with moist air and low temperature, will indicate wind and rain.

Rise, with westerly wind, indicates probably fine weather.

A steady barometer—

With dry air and a seasonable temperature indicates a continuance of fine weather.

A falling barometer—

Rapid fall indicates coming stormy weather.

Fall, with increased moisture in the air and heat increasing, indicates and probably rain.

Fall, with dry cold air, indicates cold winds probably from the west.

Fall, after calm and warm weather, indicates rain with gusty winds.

Some Weather Proverbs.

When the sun rises with dim murky clouds, with black beams and clouds in the west, expect rain.

If the sun rises pale, there will be rain during the day.

Red skies in the evening precede fine morrows.

A red sun indicates fair weather.

A very red sky in the east at sunset indicates wind.

If the sun sets pale, it will soon rain.

A halo round the sun indicates the approach of an early storm.

Haze and a purple western sky indicate fair weather.

If the sun burn more than usual, or there be a halo around him in fine weather, expect rain.

A blur of haziness about the sun indicates coming storm.

In conclusion, it might be stated that some practical knowledge of meteorology is a necessary brick in the edifice of scientific agriculture.

DRY FARMING.

The following interesting letter on "Dry Farming" comes to us from Mr. Kr. J. Yannum, a farmer at Allora. It exemplifies the old adage that "there is nothing new under the sun." We should much like to know whether

our correspondent was successful in raising crops during the big drought in Queensland, because, if so, the question of arid farming would not be a matter for experiment, but for general practice:—

Perhaps it might be of some interest to the readers of the "Agricultural Journal" to learn that the so-called "dry farming" now heralded as a wonderful American invention is an old acquaintance of the farming fraternity in parts of Europe. In Denmark, for instance, my father used "dry farming" as far back as I can remember. Perhaps he was one of the pioneers. I cannot tell, but I remember that about the year 1870 we had tremendously big crops, whilst our neighbours had very little, and I also remember how they came and bought stack after stack from us.

The subpacker is an implement I have known all my life. In Denmark we called it "Ringtromle"—that is to say, "ring-roller"—and I am pretty sure you will not be able to find many farms there without a "ringtromle"; and where the soil is heavy you will find a disc harrow also.

The system in vogue in Denmark is as follows:—When the crop is removed—about September—the stubble will receive a sharp barrowing or very light ploughing, followed up later on by the main ploughing as deep as possible. Next spring, when the soil is just dry enough to work, it is reduced to as fine a tilth as possible. Then the seed is sown, to be followed immediately by the ringtromle. Is the soil light, the work is finished; is it heavy, a very light harrow will follow the subpacker.

Of course, the mode of "dry farming" must differ according to soil, climate, &c., but when a farmer knows that he can store water by help of cultivation, it is not so difficult to find the right way of doing it, but each individual farmer must "stick his finger into his soil and smell where he is."

In Queensland intelligent and industrious farmers are always on the lookout for more land, but they are not always looking in the right direction. Especially where the soil is deep and the weather uncertain, it ought to pay much better to shift the boundary downwards rather than outwards. In other words, cultivate deeply.

Storing of water by help of deep ploughing, subsoiling, packing, &c., is not an American professorial invention—it is an old, well-known system of cultivation, but a good one all the same.

As I have said, hard-and-fast rules cannot be given. Heavy black soil will require a cultivation different to that for light and poor soil; and even when a farmer wishes to store water he must take care at the same time not to store too much weed. The storekeeper can sell you all the tools you want, the man of science can supply you with information about the laws of Nature, but you will have to supply your own brain—if you are going to succeed.

A YEAR'S DEVELOPMENT IN THE BLACKALL RANGE.

Nowhere has there been such rapid conversion of the primeval scrub and forest into pretty farms and orchards as in the Blackall Range. When the Messrs. Smith and others struggled manfully to attain the honourable independent position they now occupy through their own strenuous battling with apparently insuperable difficulties, the Blackall Range seemed destined to remain in the sole possession of the timber-getter, but the resolute farming pioneers came along, the sugar-mill at Nambour was erected, and since then the march of the Blackall men has been a continuous triumphal progress. We give here the result of one year's work in the heavy, densely-timbered vine scrub of the district. In 1905 the scrub was felled, and in 1906 the stumps have even vanished: strawberry fields, orange groves, and maize fields occupy their place. Truly *Labor omnia vincit.*

Plate XXII.

A YEAR'S DEVELOPMENT ON THE BLACKALL RANGE.

The companion pictures published above show how quickly our rich scrub lands may be turned to profitable account. They represent the same piece of country on the Blackall Range, and what has been accomplished within a year. In September, 1905,

Dairying.

PRICE OF LAND FOR DAIRYING IN NEW ZEALAND AND QUEENSLAND.

When the price of our best and most fertile Crown lands is compared with prices paid in New Zealand for land suitable for dairying, it might truly be said that such land is almost given to the Queensland dairy farmer. There is no better soil in the Commonwealth or New Zealand than is to be found in boundless extent on the estates which have been purchased by the Government for close settlement, and on the Crown lands open to selection in various parts of the State. These rich lands, well watered and richly grassed, have been sold, and are still being sold, to *bonâ fide* farmers at from £1 5s. to £4 per acre. At this moment about 7,000 acres of fine dairying and agricultural land have been thrown open in the Gympie Land Agent's District for selection by intending emigrants from Great Britain. The land is all virgin soil—scrub and forest—and is equal to the rich soil surrounding Toowoomba. The township of Murgon, where this land is situated, is connected by rail with the port of Maryborough, only 93 miles distant, and there is a daily train service between Murgon, Maryborough, and Brisbane. The adjacent country is being rapidly settled on. The size of the farms ranges from 130 to about 500 acres, and the purchasing price is but from £1 5s. to £1 12s. 6d. per acre, extending over a period of twenty-one years, without interest, if regular annual payments are made; or, if the selector please, he can pay the whole of the purchase money within a week after receiving a license to occupy. As a deed of grant cannot, however, be issued for five years, the selector will be paid 3 per cent. interest on his money by the Government during that period, at the close of which, having fulfilled the easy condition of fencing or of making other improvements equal to the cost of fencing, he obtains a deed of grant, and the land becomes his absolute property in perpetuity.

Now, compare this with the cost of land in New Zealand. At a recent land sale at Hawera, we learn from the "New Zealand Farmers' Weekly," the auctioneer declared that farmers never had such a good opportunity before. At Palmerston North £56 per acre was given for land for dairying, and it was not uncommon in the Manawatu district to pay £40 to £42 per acre for agricultural and dairying land. Of the Hawera land some was passed in at £52 per acre, one farm was sold at £48 per acre, and eventually the balance, in one lot, went at £48 per acre. The land in question is situated 2 miles from the town of Hawera. An estate in the Poverty Bay district was repurchased by the Government at £5 3s. per acre for closer settlement. Of course, there are lands in New Zealand, suitable for stock, purchaseable at prices from £3 per acre upwards, but anyone desirous of settling on rich agricultural land within reasonable distance of a large market town with railway communication, good roads, &c., such as are obtainable in Queensland, at such prices as we have mentioned, will have to pay high prices.

One great advantage possessed by the settler in Queensland is the varied choice of products of the soil. All the year round the products of the tropical and temperate regions of the world grow side by side. Coffee and potatoes, cotton and cereals, mangoes and apples, British oak and plane trees, and the Queensland bunya, the cherimoya, and guava—all these may be seen growing together in one locality. Where else is this possible? In colder colonies, buildings have to be erected for housing dairy cattle and stabling horses in winter. Nothing of the kind is needed in Queensland. Dairy cattle are not even universally rugged during our mild winters, whilst station stock, sheep, cattle, and horses roam over the plains and bush all the year round without needing shelter of any kind.

Such a country should appeal strongly to emigrants.

Poultry.

PULLETS *V.* COWS OR SHEEP.

A correspondent of the "New Zealand Poultry Journal" advocates the raising of poultry by farmers, and rightly so. We believe that it is only on the farm that poultry will pay, and it is on the farm of the United States of America that tens of millions of dollars are annually raised by poultry and eggs. But it seems rather far-fetched to compare the raising of lambs and the production of wool with the poultry industry to the detriment of the former. Poultry farms have been tried over and over again in Australia, and have signally failed. We do not say that good profits may not be derived from, say, 50 fowls, but it is not safe to reckon that 50 hens lay 50 eggs a day, or that each hen will raise so many chickens in the year. Such calculations are very fallacious, and we should prefer to figure on the monetary results of keeping 100 good ewes rather than on the possible returns from 100 hens. However, it is fortunate that all people are not of the same opinion. We take the following from "Wyandotte's" letter to the "Poultry Journal":—

"I am anxious to say a word to farmers concerning the present extent and future prospects of the poultry business, and, because farmers as a class are inclined to ridicule anyone who gives the hen and her product a place among the live stock and farm products, I am particularly glad of an opportunity to write a few words to them. Time was, and not long ago either, when one could hardly claim that poultry-raising was a business, but things are changed now, and there are people in all parts of New Zealand who are giving poultry their exclusive attention. Compare the hen with the sheep. The sheep fancier says: 'I produce wool and spring lamb and mutton. I have three ways in which I can market my goods.'

"He is 'not in it' with the poultry farmer. The latter can sell fresh eggs every month in the year on a commercial basis, and, if he studies his business, breeds purebred stock, and does a little advertising in 'New Zealand Poultry Journal,' which is without doubt one of the best poultry papers published anywhere, he can for five months in the year make a good profit out of his winter eggs. Lamb commands a good price in the spring, but good young birds are in demand every month in the year. Carry our sheep and chicken comparison a step further, notice how many more people call for roast chicken than for roast mutton. We are a meat-eating people, but when roast chicken is on the bill of fare nine out of ten people will order it. Watch it as I have done, and you will understand why well-fed and well-dressed poultry is always in demand.

"One more advantage that the hen has over the sheep. You can start in the chicken business with one-fourth the capital, and will begin to get returns in one-fourth of the time. How do I figure it? Thus: Start at the foundation in both lines. In the hen business buy eggs for hatching—you can't buy eggs to hatch lambs, but get as near as you can, buy ewe lambs for your future breeding stock, and then see where you will be. In three or four months from the day you hatch your chicks, one-half of your chicks (the males) are ready for the market, and will yield you about as large a profit as at any subsequent time. You are beginning to get returns. Three months later (if you have a good laying strain) your pullets will be doing a profitable business at the egg basket. Where are your returns in the sheep business now? At least six months in the future, when the fleece is shorn, or still another year later, when the first lambs are ready for market. Now, the advantage the hen has in giving quicker returns is just as apparent (yes, more so!) if instead of the sheep you compare the hen business with dairying, beef-making, or horse-raising. The hen is the best illustration of the time-honoured 'nimble sixpence.' Now, I am not urging this matter to the fancier, but to the farmer, to the man who generally ignores the hen as too small for him to notice. I want to say to this man, procure now about fifty purebred early

hatched pullets. They will cost no more than a good cow; give these fifty pullets as much care, as much room, as much food, and as much thought as the successful breeder or dairyman gives to his best cow, and you will get more and bigger returns from them than you can possibly get from the cow. I suggest that you get superior stock at good prices, for the same reason that you would prefer wellbred cattle at good prices, only in the case of poultry it is done with far less expenditure.

"There is absolutely no man so favourably situated to get of it all there is in it as the farmer; you, the farmer, with corn, oats, wheat, skim milk, seeking profitable market, are the man above all others to realise handsomely on the investment I have suggested. Don't build expensive houses, but see they are light, sunny, well ventilated, dry, &c. Choose whatever variety is most suitable to your locality. If eggs alone is your object, be sure and get a good laying strain, and keep warm in cold weather. See that the pullets are uniform in age and size. Don't mix hens with pullets. In a future article I will give the farmer a few hints on geese and ducks as a profitable commodity."

EGG FARMING—INFERTILE EGGS.

By M. FERN, Instructor in Poultry-breeding.

On the average farm where poultry-raising is being carried on for egg production, one is often struck with the losses that occur simply through want of thought. On most farms will be found as many males as females. Now, where eggs are the chief object, male birds are not necessary—in fact, are a loss; this is particularly the case where birds of the lighter breeds are run—such as Leghorns, Minorcas, &c. It would pay the egg farmer much better to chop off the heads of all the young cockerels as soon as he could distinguish their sex, and in these breeds that can be noticed at a very early age. It does not pay to grow to maturity cockerels of these breeds, and they take up the room of pullets. The old idea that male birds were necessary for egg production has long been exploded; a glance at the records of the various egg-laying competitions will convince the most sceptical of farmers, when he reads the wonderful records of hens that have no male birds running with them. A record of 230 eggs has been put up by competition birds in twelve months, whereas from his beloved barndoor he gets, in a good season, a 90 average.

Another great advantage to be gained from the system of running hens alone is the fact that the eggs being infertile—*i.e.*, they have no male germ—they will keep fresh a much longer time, as, there being no life in the egg, there is nothing to decay. In the ordinary way eggs from a hen that has been running with a male bird will start to develop at a temperature of 60 degrees. It follows, of course, that the contents will gradually undergo a change, and, as the embryo cannot mature at that temperature, it will die, and decay will set in. The system of gathering eggs on the farm assists the decay, as they are not gathered regularly; especially is this the case with the stolen nest, where a number of eggs have been laid and sat on for days before being sent to market, with the result that great numbers of them are not fit even for cooking purposes.

To prove the keeping qualities of infertile eggs, I carried out a test during last January to March. On the 12th January I placed twelve infertile eggs in a small cardboard box and sealed them. On the 13th February, a month later, I opened the box, and took out six of the eggs, and tested them in various ways. In the first place they were placed amongst a number of fresh-laid eggs, and several officers of the Department were asked to pick out the month-old eggs, but could not do so. We then broke three of them into glasses, and in each case they broke all right, and were perfectly fresh in appearance, flavour, &c. The remaining three were then boiled, and they, like the others, proved to be perfectly fresh.

On the 20th March, over two months from time of first sealing up the box, the remaining six eggs were tested, and it was found that four were fresh

and two slightly stale. The eggs were not treated in any way, and were kept in a drawer in the office, subject to all the hot weather prevailing during those months. A pretty severe test.

Now, the ordinary egg ceases to be a "fresh egg" after a week; after that, it is only a question of degree as to how bad it is.

So by this method a farmer saves the feed and room taken up by surplus males, and turns out a much better and more marketable egg. A better price can always be secured for infertiles, which are sold as "specials," and always command a higher figure in the market, as they can be guaranteed.

Infertiles can be shipped to a great distance, and could be exported with safety.

Let the doubtful farmer try this for a season. Enclose a small space for his male birds; as soon as the youngsters begin to crow, they can, if of the heavier breeds, be yarded up and fattened for market; they will put on condition quicker than if allowed the run of the farm. This enclosure could be used in the breeding season for a breeding pen; as, of course, now that the farmer has no male birds running about, it will be necessary for him to select his best laying hens and mate them to a strong vigorous male. From this pen he will be able to raise strong, healthy stock, and not, as under his old system, or rather lack of system, be breeding from a lot of immature birds that will only produce scrubbers not fit for egg producing or market purposes, so that his result will be—

(1) The production of a large number of special or guaranteed eggs.
(2) A better class of table poultry.
(3) Breeding from known good producers will insure increase of egg production.

All this will be gained at the cost of a few yards of wire-netting and a little common sense.

I would, therefore, again urge egg farmers to separate the males and females at an early age; and, in the case of the lighter breeds, to use the axe; in the heavier breeds, such as Orpingtons, Wyandottes, Rocks, &c., pen up and market the cockerels at five months. Thus a profit will be made from both sides of the industry.

The farmer who produces infertiles should mark each egg with the name of his farm. If reliable, the brand will soon get known and be asked for. There is often a large margin between ordinary and special eggs.

Specials have never, even in the most plentiful months, dropped below a paying price, and are often 6d. per dozen better than ordinary case eggs.

So why not produce specials—*i.e.*, infertiles or guaranteed eggs—at a less cost than you are now producing doubtful eggs at?

Start straight away. Yard up the cockerels and in a week all or most of your eggs will be infertiles. In two weeks all will be right, and in three weeks you will have put another pound on the birds you have shut up, a gain all round.

The influence of a cockerel ceases after a week or ten days. So that the grower can go in for this system right away.

An egg farmer can only get the value of a cockerel once, but in the case of a hen she returns, if of a good laying strain, five times her value in a year.

Another fault on the farm is keeping the hens past their profitable age. In a general way a hen ceases to be profitable after she is two and a-half years old. After that she should be fatted up and sent to market, and younger pullets take her place. There should be no sentiment about the chicken business; every hen on your farm should be returning her full value, if not—use the axe.

Better results will always be obtained where birds are run in small flocks than when run in large numbers. Four pens of fifty hens will return a much better average than 200 given free range, and will well repay the cost of building yards.

Treat the hens as part of a business concern, where waste food is turned into eggs and poultry, at a very small cost to the farmer.

Botany.

CONTRIBUTIONS TO THE FLORA OF QUEENSLAND AND NEW GUINEA.

By F. MANSON BAILEY, F.L.S., Colonial Botanist.

Order CRUCIFERÆ.

CARDAMINE, Linn.

C. heterophylla, *Hook.*, Ic. Pl. t. 58. Rhizome sometimes perennial. Stems slender, about 1½ ft. long. Radical leaves in a rather dense cluster, the petioles rather l ng, pinnatisect; terminal segment somewhat ovate-cordate, about 1 in. long and ½-in. broad, often with 1 or 2 lobes or teeth at the base; the lower segments rather distant, small, narrow, and sometimes toothed; stem leaves very narrow, with few narrow segments or teeth. Flowers rather small, sepals and petals narrow, slightly purple-stained, the latter longer and much broader than the former. Pods slender, erect, with the pedicels about 2 in. long. Stigma nearly sessile. Seeds as in *C. hirsuta*, Linn., under which it is placed doubtfully in the Fl. Austr. I. 70.

Hab.: Gatton College grounds, *J. F. Bailey;* not previously recorded for Queensland.

LEPIDIUM, Linn.

L. virginicum, *Linn.* Plant annual; habit erect with somewhat erecto-patent branches, about 1 ft. high, glabrescent. Leaves more or less laciniate, some quite entire, those most divided near the base of plant. Stem and branches ending in racemes of minute white flowers and pods. Pedicels spreading, twice or thrice as long as the pods. Petals 4, obovate, obtuse, pure white. Stamens from 2 to 4. Pods nearly orbicular, wingless, emarginate at the top. Seeds oval compressed.

Hab.: A roadside weed of the United States of America and many other countries; now becoming a weed near Gatton College.

Order ORCHIDEÆ.

PHALÆNOPSIS, Blume.

P. Rosenstromii, *Bail. sp. nov.* Leaves deep-green, 4 or 5, distichous, 9 in. long, 2 in. broad, oblong, of comparatively thin texture, midrib not very prominent, longitudinal nerves numerous, transverse veins numerous and prominent in the dried specimen, apex obliquely emarginate, leaf-lamina obliquely spreading above the sheath; the latter hard-coriaceous, about 2 in. long, and more or less flattened. Panicle composed of racemose branches of about 10 in. long, bearing each about 8 to 10 showy white flowers, here and there stained with yellow. Pedicels slender, about 1½ in. long. Sepals ovate-lanceolate, about 1 in. long, base cuneate; the dorsal one rather broader than the others. Petals roundish-ovate, about 13 lines broad, scarcely clawed. Labellum about as long as the other segments, 3-lobed, with a 2-horned callosity at the base, lateral lobes curved over the base of the segment, middle lobe somewhat strap-shaped, bearing at its apex 2 twisted cirrhi. Column incurved, angular. Rostellum prominent.

Hab.: On trees, high from the ground, Daintree River, *Gus. Rosenstrom.*

DENDROBIUM, Swartz.

D. obcuneatum, *Bail. sp. nov.* Rhizome (?) Stems (only 7 in. of the upper portion received) compressed, about 2 lines broad, clothed by the closely adhering leaf sheaths, the dark tops of which give to the stem a ringed appearance. Leaves appear to have been distichous, but none were attached to the stems when received; more or less obcuneate, tapering towards an obliquely-

emarginate apex, 2 to $2\frac{3}{4}$ in. long, the base $\frac{1}{2}$-in. to $\frac{3}{4}$-in. broad, closely and prominently striate. Flowers (probably white) solitary or perhaps several (all detached), arising out of clusters of short scarious bracts. Pedicels about 5 lines long. Sepals falcate, linear, subobtuse, about 9 lines long and nearly 2 lines broad. Petals similar, but shorter and of thinner texture than the sepals. Spur short, curved. Labellum shorter than the other segments, deeply fringed, and folded back upon itself, covering the shorter column.

Hab.: East Coast, British New Guinea, *Rev. Copland King.*

BULBOPHYLLUM, Thou.

B. Coplandi, *Bail. sp. nov.* Rhizome creeping, about $1\frac{1}{2}$ lines diam., rooting copiously. Pseudobulbs ovate, 4 lines long, $3\frac{1}{2}$ lines broad, of a glossy bright-yellow, embedded at the base in thin scarious torn scales. Leaves orbicular-ovate, thick, about $\frac{1}{2}$-in. long, longitudinally striate, very shortly tapering to a twisted base, apex emarginate. Flowers large for the size of the plant. Pedicels with ovary about 7 lines long, erect. Expanded flower $\frac{3}{4}$-in. diam. Segments narrowed into thread-like points and prominently lined; petals much thinner and shorter than the sepals. Labellum with a veiny elongated membranous end lobe. Spur short and obtuse. The two dry flowers did not allow of more minute description.

Hab.: East Coast, New Guinea, *Rev. Copland King.*

TRANSPLANTING TREES.

Some very interesting work in connection with transplanting trees took place recently in the Brisbane Botanic Gardens, when some fairly-sized weeping figs were moved from the Parliament House side of the gardens to the river bank. As other evergreen trees may be treated in the same manner, it has been thought advisable to reproduce some photographs illustrating the work there carried out.

The material necessary for the work, besides the usual garden tools, are:—Several stout plants, say 4 feet or 5 feet by 2 feet, ropes, rollers, and canvas bagging.

The first work is to dig a trench about 2 feet deep around the tree, about 3 feet away from the trunk, leaving a broad opening on the lowest side. The soil is then reduced towards the trunk until a good ball (without many of the fibrous roots being injured) is obtained. The ball is then undermined and two planks placed underneath. These are then tied or bolted together by two shorter crosspieces, as shown in Figures 2, 3, and 4. The sides of the ball are then enclosed in bagging, and the tree held firmly to the staging formed by the planks by means of ropes. The staging is then elevated at the nearest end, and an inclined plane made with the aid of a couple of broad planks, placed partly beneath. Rollers are then placed between these and the staging, and the tree hauled on to the trolly, as shown in Figures 2 and 3. The method of placing the tree in its new position is shown in Figure 4. Provision should be made so that the staging may be untied or unbolted, and easily withdrawn from the hole.

The following items should be observed in connection with the work.

The hole prepared for the reception of the tree should receive a good dose of rich soil, in order to induce a quick growth of fibrous roots.

The depth of the hole should correspond with that of the ball.

The head should receive a judicious head-pruning to counter-balance the necessary shortening of the roots.

Before lowering into the hole, the injured portions of roots should be cut clean back to a sound part.

If the weather is dry at time of planting, the hole should receive a good soaking prior to the planting; and, after the soil has been filled in and made firm, a good mulch applied.

Plate XXIII.

Removing Large Trees in the Brisbane Botanic Gardens.

Tropical Industries.

THE SUGAR INDUSTRY, No. 1.

The Work of the Sugar Bureau.

(Compiled from the Annual Reports of the Bureau of Sugar Experiment Stations.)

By THE EDITOR.

For some time the work of experimentalisation in cultivation, irrigation, selection of varieties of cane and green manurial crops was conducted exclusively at the Mackay Experiment Station. To these were added crops for feed purposes, including the growth of roots, bulbs, and grain crops, whose values are ascertained by feeding tests; the object being to furnish examples of crops that can be made not a substitute for, but supplementary to, the sugar crop. The experiments in cultivation are intended to demonstrate the necessity and primary value of deep, thorough, and subsoil cultivation, the farmers being advised that such cultivation must precede all other devices for increasing production. We shall presently show what has been the result to the farmers of these experiments where they were subsequently carried out on what may be called substations. In order to bring the purpose and actual work of the Central Experiment Station at Mackay more directly before the farmers in other districts, the Director, with the co-operation of the cane farmers' asociations of the respective subdistricts, established, in the year 1901, seven of these outside stations, where the work would be carried on by a farmer selected in each locality, but under instructions from the Director of Experiment Stations. In 1904 these substations were increased to fourteen. In furtherance of this important work, the Sugar Bureau provided each of the substations begun with necessary subsoiling implements, with lime where lime was advised, and in all cases with expensive fertilisers that analyses of the soils had indicated were required.

These substations were established in the following localities:—

1. Mossman River.
2. Mulgrave, Cairns.
3. Sundown, Johnstone River.
4. Mundoo, Johnstone River.
5. Ripple Creek, Herbert River.
6. Halifax, Herbert River.
7. Proserpine River.
8. Burdekin River.
9. Woongarra, Bundaberg.
10. Gooburrum.
11. Pialba.
12. South Isis.
13. North Isis.
14. Beenleigh, Logan.

The mode of treatment of the land of the several experiments was as follows:—

Farmers' Test.—Ordinary cultivation of the district; no manure.

No. 1 Experiment.—Deep, thorough subsoil cultivation. Manures: Lime, potash, phosphoric acid, and nitrogen.

No. 2 Experiment.—Deep, thorough subsoil cultivation. Manures: Potash, phosphoric acid, nitrogen.

No. 3 Experiment.—Deep, thorough subsoil cultivation; no manure.

Nine of the above fourteen substations carried out the work in every particular, and reported the results to the Sugar Bureau. We should be glad if our space would permit of our giving full particulars of each report, but the results of two or three experiments will suffice to indicate their value in determining the conditions of cultivation and manuring absolutely necessary for the production of far heavier crops than are obtained by the ordinary methods adopted in the sugar districts.

We will consider the substation at Halifax, where the work was undertaken by Messrs. Anderssen Bros. The soil of the experimental plot was considered the poorest part of the field. The depth of soil was less than 1 foot, increasing to 15 inches towards the Farmers' Test Plat. The land had been under cane crops for eighteen years, and was considered exhausted, and previous to being taken over for the experiment had borne a light, green crop.

The mode of treatment of the land was as above stated. The cane was planted in all the experiments and upon the Farmers' Plat on 23rd March, 1902, and all were cut and harvested during the last week of September, 1903, they having been in the ground eighteen months.

Following are the analyses of the cane, cost of production per acre, and value and cost of the crop:—

Analyses of the Cane.

Experiment.	Sugar in Cane.	Glucose in Cane.	Quotient of Purity.
	Per cent.	Per cent.	Per cent.
Farmers' Test...	14·0	0·47	90·5
No. 1 Experiment	13·3	0·72	88·3
No. 2 „	13·4	0·69	88·4
No. 3 „	14·8	0·40	90·5

Cost of Production per Acre.

	£	s.	d.
No. 1 Experiment...	£24	10	6
No. 2 „	21	10	6
No. 3 „	16	13	6

The cost of production of the Farmers' Test was not furnished. The lime manure applied extends in its action over five to seven years. The full cost of the other manures is charged against this crop. The experiments were conducted with white labour, so that the growers were eligible for, and claimed, rebate of excise, which in the Halifax district is 5s. per ton. The value of the cane at the mill was 14s. per ton, which, with the rebate of excise, amounted to 19s. per ton. The final outcome of the experiments was found to be as follows:—

Value and Cost of the Cost.

Experiments.	Weight of Cane per Acre (English Tons).	Value of Crop per Acre.	Cost of Crop per Acre.	Profit on Crop per Acre.
		£ s. d.	£ s. d.	£ s. d.
Farmers' Test	25·0	23 15 0	...	...
No. 1 Experiment	42·5	40 0 0	24 10 6	15 9 6
No. 2 „	35·7	33 17 7	21 10 6	12 7 1
No. 3 „	31·2	29 13 4	16 13 6	12 19 8

The results of the first ratoon crop from the above experimental plat, from which the plant crop was harvested in 1903, were as here given:—

Crops.	Weight per Acre (First Ratoon).	Total Yields per Acre (Plant and First Ratoon).
	Tons.	
Experimental Plat	25·9	68·4
Farmers' Plat	17·0	42·0

VALUE AND COST OF FIRST RATOON CROP.

Crops.	Weight of Cane per Acre.	Value per Acre.	Cost per Acre.	Profit per Acre.
	Tons.	£ s. d.	£ s. d.	£ s. d.
Experimental Plat	25·9	25 17 11	15 16 5	10 1 6
Farmers' Plat	17·0	17 0 0	9 9 6	7 10 6

The crop was grown by white labour, and the bonus was 5s. per ton.

We will now consider the figures relating to the second ratoon crop from the same plats, which complete the experiment which Messrs. Anderssen Bros. undertook to carry out:—

Crops.	Weight of Cane per Acre—Second Ratoon Crop (1905).	Total Yield per Acre—Plant Crop, 1903; First Ratoon, 1904; Second Ratoon, 1905.
	Tons.	Tons.
Experiment Plat	31·2	99·6
Farmers' Plat	16·0	58·0

VALUE AND COST OF SECOND RATOON CROP.

Crops.	Weight of Cane per Acre (English Tons).	Value of Crop per Acre (Price and Bonus)	Cost of Crop per Acre.	Profit on Crop per Acre.
	Tons.	£ s. d.	£ s. d.	£ s. d.
Experiment Plat	31·2	31 4 0	15 16 5	15 7 7
Farmers' Plat	16·0	16 0 0	9 9 6	6 10 6

These final results show that, while the yield upon what is called the Farmers' Plat of the plant, first ratoon, and second ratoon crops amounted to 58 tons, the experimental crops, covering the same length of time, totalled 99·6 tons, or an increase of 41·6 tons, equal to 71·5 per cent.

The experimental plat was cultivated, trashed, cut, and delivered by white labour, as in former years. The Farmers' Plat was worked by coloured labour.

Another very instructive experiment was conducted by Mr. Ralph Reid, at Mundoo, Johnstone River. This substation consists of 2½ acres. Two acres, composing Plats Nos. 1, 2, 3, 4, were ploughed for the plant crop to a depth of 12 inches, and subsoiled to a further depth of 6 to 7 inches, giving 18 to 19 inches of loose earth, which was cross-ploughed and worked into a perfect state of tilth. After the plant crop was taken off, the ground for the ratoon crop just harvested (1905) was ploughed deeply and subsoiled between the rows, and a manure composed of nitrate of soda, sulphate of ammonia, and sulphate of potash was applied at a total cost of £2 12s. per acre. No phosphoric acid was applied to this ratoon crop.

The weights of cane per plat and per acre were furnished by Mr. Foster, manager of the C.S.R. Company's mill, Goondi.

RESULTS OF FIRST RATOON CROP.

Plats and Areas.	Manures.	Weight of Cane per ½-acre.	Weight of Cane per Acre.	Total Yield per Acre of Plant Crop and First Ratoons.
		Tons.	Tons.	Tons.
No. 1 Half-acre	Lime and Manure	9,414	18,828	43·99
„ 2 „	Manure	10 633	21,266	46·05
„ 3 „	ditto	11,227	22,454	47·43
„ 4 „	Lime and Manure	11,584	23,168	49·93
Farmers' Plat (ordinary cultivation)	...	2,253	4,506	16·67

These results more than justify the experiment. They show that while *ordinary cultivation without manure* in the two crops—plant and ratoons—has yielded 16·67 tons of cane per acre, the deep and subsoil cultivation, supplemented by specially selected manures, has given in the plant and first ratoon crops together a yield of no less than 47 tons per acre.

VALUE AND COST OF THE FIRST RATOON CROP.

Plats and Areas.	Yield of Cane per Acre.	Value of Crop per Acre.	*Cost of Crop per Acre.	Profit of Crop per Acre.
	Tons.	£ s. d.	£ s. d.	£ s. d.
No. 1 Experiment Plat ...	18,828	14 2 5	8 1 3	6 1 2
„ 2 „ „ ...	21,266	15 19 0	8 1 3	7 17 9
„ 3 „ „ ...	22,454	16 16 10	8 1 3	8 15 7
„ 4 „ „ ...	23,168	17 7 6	8 1 3	9 6 3
„ 5 Farmer's Plat	4,506	3 7 8	2 15 0	0 12 8

* Coloured labour was used.

It was thus shown by Mr. Reid that the 2 acres of land treated according to the instructions of the Sugar Bureau yielded a clear profit of £8 0s. 2d. per acre, while the Farmers' Plat, with ordinary cultivation, left 12s. 8d. per acre. It should be noted that during these experiments grasshoppers and grubs did considerable damage to the crop.

The results above recorded make it unnecessary for more to be said, although several other instances are given in Dr. Maxwell's reports, showing in all cases that more pronounced comparative results in favour of scientific or rational methods of cane-production have not been attained in other cane-sugar countries. No words can add further to their significance, and it is for the cane-growers to decide for themselves whether they will adopt modern methods of production or not. We should think the choice is not hard to make.

In concluding this portion of the article, we give below a table showing the yields per acre of all the substation experiment plats, with a comparative statement of the results obtained by the farmers by ordinary cultivation, side by side with the experimental plats. Great care was observed to be sure that soil richer than the average of a district was not chosen. In several localities, such as Mundoo, Pialba, and Mulgrave, soils of the lowest fertility, and which had been cropped and exhausted, were selected for experimental purposes.

GENERAL RESULTS OF INTENSIVE AND ORDINARY CULTIVATION.

Locality of the Sub-stations.	Age of the Crop.	Nature of the Crop.	Intensive Cultivation (Plats of Sub-stations).	Ordinary Cultivation (Farmers' Areas).
			Tons.	Tons.
Mossman	13 months	1 Ratoon ...	21·5	14·5
Mulgrave	ditto ...	Plant ...	21·0	11·0
Sundown	17 months	ditto ...	25·5	20·8
Mundoo	ditto ...	ditto ...	25·4	12·1
Halifax	13 months	1 Ratoon ...	25·9	17·0
Woongarra—				
Irrigated	ditto ...	Plant ...	30·0	19·0
Non-irrigated	ditto ...	ditto ...	16·0	9·0
Pialba	ditto ...	ditto ...	10·5	7·0
Beenleigh	ditto ...	ditto ...	25·3	24·9
North Isis (part irrigated) ..	ditto ...	1 Ratoon ...	38·2	12·0
Means = ...	...	...	23·9	14·7

The "intensive cultivation" of the experimental plats gave 9·2 tons an acre, or 62½ per cent. greater yield than the "ordinary cultivation" on the farmers' plats. Yet the farmers' plats, being close to the experimental plats, appear to have had somewhat better treatment than the fields in the districts. The farmers' plats gave 14·7 tons per acre, while the average yield per acre of the whole State for the past five years was only 13·2 tons per acre. There is no reason why the yield per acre of Queensland, which is about the lowest in the world, should not be doubled.

THE INFLUENCE OF STRIPPING ON THE YIELDS OF CANE AND SUGAR.

"To trash or not to trash?" has been a question so frequently debated amongst Queensland sugar-planters, and as frequently without any definite or unanimous decision being arrived at, that any absolute proof of the value or of the uselessness of trashing has always been received with interest and subjected to earnest discussion. The trashing of cane in our Northern canefields is a labour which few white men are eager to undertake, whilst men willingly undertake to cut cane. The latter work is carried on in the open air, so to speak, but the trashing has to be performed in a dense mass of cane, where no breeze can reach the workmen, and where the heat of a vertical sun is aggravated by dust and "cane-itch." If it could be shown that trashing is superfluous, very little of such work would be undertaken. If it could further be demonstrated by actual experiment that the yield of cane and of sugar is actually lessened by the process, not a cane in Queensland would be stripped, and one of the great objections to work in the tropical canefields by white men would be removed.

On this important point we have just received a little pamphlet under the above title (Bulletin No. 16), by Professor C. F. Eckart, Director of the Division of Agriculture and Chemistry, in the report of the Experiment Station of the Hawaiian Sugar-planters' Association. The pamphlet is too long to be printed in a single issue of the Journal, but we propose to conclude it in our October issue.

The following is the first part of the report:—

Probably no subject relating to the field operations of the sugar industry in these islands has been more freely discussed by plantation managers than that of stripping, or the removal of dried leaves from the cane stalk. Widely

divergent opinions are held as to the economy of this expensive practice, and owing to the radically different conditions under which cane is grown in this country it is natural that the experience of some plantations in this particular has not always been in conformance with that of others. The question is largely a local one, and the profits or losses from stripping are determined by the conditions under which the operation is performed. These controlling factors have, in recent years, become so involved through the ravages wrought by the leaf-hopper pest and fungus diseases that the most careful judgment is now required to determine whether or not the practice may be employed to advantage in any given instance.

The object of this bulletin is to present such data as have been obtained from carefully conducted stripping tests at the experiment station. While these experiments were naturally carried out under conditions quite dissimilar in many respects from the conditions which prevail on many plantations, the importance of the results yielded by the tests cannot be sufficiently emphasised. It is true that the soil, climatic, entomological, and pathological factors which influence the growth of cane in the experiment station field may be very different in their proportional values from those which control the general plantation yields, but it is also true that two fields may be found on nearly all of the plantations which differ from each other to an almost equal extent. It would be far from reasonable to suppose that the results from such stripping experiments as are described in these pages would hold good for all of the plantations in the group, and it would be quite as unreasonable to consider them (taking them in a general way) as applying only to that particular spot in the Hawaiian Islands where they were carried out. The results show that under certain conditions thousands of dollars can be saved annually by not stripping, and they also lay no little stress on the value of carefully conducted plantation field tests as indispensable guides in the matter of such agricultural practices.

FIRST SERIES.

These tests were started by Mr. R. E. Blouin on 27th July, 1901, and were harvested in April, 1903. The Lahaina variety was used in the experiments, and the plats were designated as follows:—

Plat No. 1: No stripping.
Plat No. 2: One stripping; June, 1902.
Plat No. 3: Two strippings; March and October, 1902.
Plat No. 4: Three strippings; March, August, and November, 1902.

From these tests the following results were obtained:—

WEIGHT OF CANE PER ACRE.

Number of Strippings.	Weight of Cane per Acre.
	Lb.
No stripping	150,950
One „	156,467
Two strippings	142,586
Three „	140,031

ANALYSIS OF JUICES.

Number of Strippings.	Brix.	Sucrose.	Purity.	Glucose.
No stripping	20·62	19·15	92·87	·311
One „	20·78	19·00	91·43	·258
Two strippings	21·18	19·50	92·06	·241
Three „	19·82	18·15	91·57	·369

YIELD OF SUGAR PER ACRE.

Number of Strippings.	Cane per Acre.	Sucrose in Cane.	Sugar per Acre.
	Lb.	Per cent.	Lb.
No stripping	150,950	17·14	25,873
One „	156,467	17·00	26,599
Two strippings	142,586	17·45	24,881
Three „	140,031	16·24	22,741

PERCENTAGE OF GAIN OR LOSS FROM STRIPPING.

Number of Strippings.	Tons of Cane.	Gain or Loss. Cane as Basis.	Tons of Sugar.	Gain or Loss. Sugar as Basis.
No stripping	75·48	...	12·94	...
One „	78·23	+ 3·5	13 30	+ 2·8
Two strippings	71·29	— 5·6	12·44	— 3·9
Three „	70·02	— 7·2	11·37	— 12·1

The highest percentage of sucrose in the juice was obtained on the plat which had been stripped twice, although one stripping gave a slightly lower percentage of sucrose than was found in the juice of the unstripped plat. The cane which was stripped three times contained the smallest amount of sucrose in its juice, there being 1 per cent. less than was found in the case of the unstripped plat. The highest purity was found in the juice of the cane which had not been stripped.

Taking the unstripped plat as a basis, one stripping gave a gain of 3·5 per cent. on the weight of the cane and 2·8 per cent. on the weight of sugar. Two strippings gave a loss in cane of 5·6 per cent. and a loss in sugar amounting to 3·9 per cent. Three strippings decreased the cane yield by 7·2 per cent. and the sugar by 12·1 per cent. These plats were treated identically alike except with respect to stripping.

SECOND SERIES.

This series was started in June, 1904, on land which had been rested for one year and which had been manured during that time with one crop of Mauritius beans. The experiment comprised fourteen plats of four rows, each row being 50 feet in length. The two middle rows of each plat formed the bases of the comparisons; one of these test rows was left unstripped and the other was stripped three times as follows:—

First stripping, 25th January, 1905.
Second stripping, 2nd June, 1905.
Third stripping, 1st November, 1905.

With the exception of Plat No. 1, which was not fertilised, all of the cane in these tests received the same mixed fertiliser at the rate of 1,000 lb. to the acre. The composition of the mixed fertiliser was as follows:—

4 per cent. phosphoric acid, soluble in water.
12 per cent. potash, as sulphate of potash.
9 per cent. nitrogen, as sulphate of ammonia.

The times of applying all fertilisers, and the manner in which the total quantity of the mixed fertiliser was divided for the several applications, were:—

Plat No. 1.—No fertiliser.
Plat No. 2.—One application with seed, 1904.
Plat No. 3.—One application in August, 1904.

Plat No. 4.—One application in April, 1905.

Plat No. 5.—One application in August, 1904; 300 lb. of nitrate of soda in May, 1905.

Plat No. 6.—Two applications; with seed one-third, April two-thirds.

Plat No. 7.—Two applications; August one-third, April two-thirds.

Plat No. 8.—Two applications; August one-half, April one-half.

Plat No. 9.—Two applications; August two-thirds, April one-third.

Plat No. 10.—Two applications; August two-thirds, April one-third, 300 lb. of nitrate of soda in June.

Plat No. 11.—Three applications; August one-third, March one-third, May one-third.

Plat No. 12.—Three applications; August one-third, March one-third, May one-third, 300 lb. of nitrate of soda in July.

Plat No. 13.—Three applications; August one-third, March one-third, May one-third, 150 lb. of nitrate in September, 1904, 150 lb. nitrate in July, 1905.

Plat No. 14.—Three applications; August one-third, March one-third, May one-third, nitrate of soda, 100 lb. per application in June, July, and August.

The results yielded by these tests were as follow:—

DENSITY, SUCROSE, AND PURITY OF JUICE.

Plat.	Brix.		Sucrose.		Purity.	
	Stripped.	Not Stripped.	Stripped.	Not Stripped.	Stripped.	Not Stripped.
1	21·11	21·18	19·13	19·21	90·62	90·70
2	19·64	20·08	18·02	18·30	91·75	91·13
3	19·28	19·48	17·48	17·72	90·66	90·16
4	19·38	19·84	17·49	18·04	90·25	90·93
5	16·78	19·24	14·71	17·35	87·66	90·98
6	18·89	19·08	16·90	17·12	89·46	89·73
7	17·64	18·56	15·45	16 50	87·58	88·90
8	19·07	18·96	16·90	16·98	88·62	89·55
9	19·58	20·57	17·75	18·72	90·65	91·06
10	19·41	19·61	17·44	17·74	89·85	90·46
11	17·69	19·81	15·70	17 87	88·75	90·21
12	19·45	19·97	17·43	18·05	89·61	90·38
13	17·72	19·38	15·62	17·45	88·15	90·04
14	18·11	19·78	15·78	17·83	87·13	90·14
Average...	18·84	19·68	16·84	17·78	89·34	90·31

GLUCOSE AND GUMS OF JUICE, AND FIBRE PER CENT. CANE.

Plat.	Glucose.		Gums.		Fibre per cent. Cane.	
	Stripped.	Not Stripped.	Stripped.	Not Stripped.	Stripped.	Not Stripped.
1	·28	·34	·33	·44	10·1	11·5
2	·30	·32	·34	·44	10·5	11·5
3	·41	·37	·40	·47	10·3	11·4
4	·43	·32	·38	·45	11·1	10·3
5	·69	·43	·34	·44	11·5	10·0
6	·56	·42	·44	·44	11·0	11·4
7	·64	·67	·36	·38	10·0	11·0
8	·57	·55	·40	·43	11·6	11·5
9	·39	·37	·39	·44	11·4	10 9
10	·50	·51	·35	·44	10·3	11·6
11	·50	·40	·46	·44	11·7	11·1
12	·48	·40	·38	·43	10·4	11·0
13	·57	·41	·43	·41	11·1	11·0
14	·57	·45	·42	·46	10·5	10·9
Average ...	·49	·42	·38	·43	10·8	11·1

WEIGHT OF CANE AND SUGAR PER ACRE.

Plat.	Cane per Acre.		Sucrose in Cane.		Sugar per Acre.	
	Stripped.	Not Stripped	Stripped.	Not Stripped.	Stripped.	Not Stripped.
	Lb.	Lb.			Lb.	Lb.
1	186,611	181,035	17·20	17·00	32,097	30,776
2	129,460	176,679	16·13	16·20	20,882	28,622
3	142,180	196,020	15 69	15·70	22,308	30,775
4	183,562	216,667	15·55	16·18	28,544	35,057
5	133,991	222,504	13·02	15·62	17,446	34,755
6	165,092	224,421	15·04	15·17	24,830	34,045
7	147,146	195,759	13·91	14·69	20,468	28,757
8	144,445	198,982	14·94	15·03	21,580	29,907
9	156,206	182,604	15·73	16 68	24,571	30,458
10	152,547	203,861	15·64	15·68	23,858	31,965
11	128,589	194,713	13·86	15·89	17,822	30,940
12	168,316	223,637	15·62	16·06	26,291	35,916
13	134,165	188,179	13·89	15·53	18,636	29,224
14	169,013	216,755	14·12	15 89	23,865	34,442
Average ...	152,937	201,558	15·02	15·81	23,086	31,831

Weight of Cane and Sugar per Acre.

Plat.	Weight of Cane.		Weight of Sugar.	
	Stripped.	Not Stripped.	Stripped.	Not Stripped.
	Tons.	Tons.	Tons.	Tons.
1	93·31	90·52	16·05	15·39
2	64·73	88·34	10·44	14·31
3	71·09	98·01	11·15	15·39
4	91·78	108·33	14·27	17·53
5	67·00	111·25	8·72	17·38
6	82·55	112·21	12·42	17·02
7	73·57	97·88	10·23	14·38
8	72·22	99·49	10·79	14·95
9	78·10	91·30	12·29	15·23
10	76·27	101·93	11·93	15·98
11	64·29	97·36	8·91	15·47
12	84·16	111·82	13·15	17·96
13	67·08	94·09	9·32	14·61
14	84·51	108·38	11·93	17·22
Average ...	76·47	100·78	11·54	15·92

Percentage of Gain or Loss from Fertilisation and Stripping.
Based on Weight of Cane.

Plat.	Gain or Loss from Fertilisation.		Gain or Loss from Stripping.
	Stripped.	Not Stripped.	
1	(basis)	(basis)	+ 3·0
2	— 30·6	— 2·4	— 26·7
3	— 23 8	+ 8·3	— 27·5
4	— 1·6	+ 19·7	— 15·3
5	— 28·2	+ 22·9	— 39·8
6	— 11·5	+ 24·0	— 26·3
7	— 21·2	+ 8·1	— 24·8
8	— 22·6	+ 9·9	— 27·4
9	— 16·3	+ 0·9	— 14·5
10	— 18·3	+ 12·6	— 25·2
11	— 31·1	+ 7·6	— 44·0
12	— 9·8	+ 23·5	— 24·7
13	— 28·1	+ 3·9	— 28·7
14	— 9·4	+ 19·7	— 22·0

PERCENTAGE OF GAIN OR LOSS FROM FERTILISATION AND STRIPPING.
Based on Weight of Sugar.

Plat.	Gain or Loss from Fertilisation.		Gain or Loss from Stripping.
	Stripped.	Not Stripped.	
1	(basis)	(basis)	+ 4·3
2	—35·0	— 7·0	—27·0
3	—30·5	0·0	—27·6
4	—11·1	+13·9	—18·6
5	—45·7	+12·9	—49·8
6	—22·6	+10·6	—27·0
7	—36·3	— 6·6	—28·9
8	—32·8	— 2·9	—27·8
9	—23·4	— 1·0	—19·3
10	—25·7	+ 3·8	—25·3
11	—44·5	+ 0·5	—42·4
12	—18·1	+16·7	—26 8
13	—41·9	— 5·1	—36·2
14	—25·7	+11·9	—30·7

NUMBER OF DEAD CANES PER ACRE.

Plat No.	Stripped.	Not Stripped.
1	2,788	4,530
2	5,401	4,879
3	5,750	2,614
4	5,053	2.265
5	9,060	3,485
6	5,227	2,439
7	8,886	7,144
8	5,227	3,833
9	6,098	3,659
10	7,841	3,833
11	6,447	5,227
12	5,924	3,659
13	9,235	4.879
14	8,189	3,136
Average ...	6,509	3,970

On reviewing the data presented in the foregoing tables, a number of interesting facts are disclosed—

1. The richest juice was contained in the unfertilised cane.
2. In each of the fourteen plats the percentage of sucrose was higher in the juice of the unstripped cane than in the juice of the stripped cane.
3. The average density, sucrose, and purity figures were considerably higher for the juice of the unstripped cane.
4. The average percentage of glucose in the juice of the unstripped cane was lower than that of the juice of the stripped cane.
5. The average content of gums was higher in the juice of the unstripped cane.
6. The average percentage of fibre was slightly higher in the unstripped cane.

7. The sucrose per cent. cane was 0·8 per cent. greater in the unstripped than in the stripped cane.
8. The unfertilised unstripped cane yielded 2·79 tons of cane and 0·66 tons of sugar less to the acre than the unfertilised stripped cane.
9. The average weight per acre of unstripped cane was 24·31 tons more than that of the stripped cane, and the yield of sugar was 4·38 tons greater.
10. In all of the fertilised plats the yield of stripped cane was less than where no fertiliser had been applied. The largest loss from fertilisation was 31·1 per cent.
11. With the unstripped cane, twelve plats out of thirteen showed a gain in weight of cane from fertilisation. The largest increase amounted to 24 per cent. One plat (No. 2) gave a loss of 2·4 per cent.
12. The largest loss in weight of cane on the fertilised plats due to stripping was 44 per cent., and the smallest loss 14·5 per cent.
13. In all of the fertilised plats, the yield of sugar in the stripped cane was less than where no fertiliser had been applied. The largest loss from fertilisation was 45·7 per cent., and the smallest loss 11·1 per cent.
14. In the case of the unstripped cane, seven out of the thirteen fertilised plats gave an increased yield of sugar. The greatest gain was 16·7 per cent., and the largest loss 7 per cent.
15. The largest loss in yields of sugar (from stripping) on the fertilised plats was 49·8 per cent., and the smallest loss 18·6 per cent.
16. A smaller number of dead canes was found in the stripped cane of the unfertilised plat than in the unstripped cane.
17. In each of the thirteen fertilised plats there were more dead canes among the stripped than among the unstripped cane.
18. There were 2,539 more dead canes (on an average) to the acre among the stripped cane than among the unstripped cane.

A discussion of the relative degree in which the various plats responded to the methods of fertilisation adopted in the plan of these experiments would be premature at this time. Safe conclusions cannot be drawn from the results yielded by a one-crop test, and it will be necessary to continues this series through a number of cropping periods before proper comparisons can be made. The fallowing and green manuring of the field in which these experiments were conducted placed the land in excellent condition, and the yield of cane and sugar on the unfertilised area approached the maximum limit of production. With succeeding crops the weights of cane harvested from the unfertilised plat will naturally diminish, and the effects of fertilisers on the other plats will become more pronounced.

The results from stripping this first plant cane crop of the series are of particular moment; and while it is essential that furthed data be obtained in this connection from future tests with ratoons and plant cane, it is also very important that the results already gained be published at this time. The losses from stripping in these several instances appear almost incredible when we grasp their full significance. For instance, if we consider the case of Plat No. 4, which gave the *smallest* loss from stripping (of the fertilised plats), and compare the yields of sugar of the stripped and unstripped cane, the losses from stripping are found to be the following:—

1. Cost of stripping.
2. Cost of fertiliser.
3. Value of 3·26 tons of sugar.

To this astonishing total must be added still another loss, which, though not so immediate, is very important; and that is, the resulting inferiority of stubble left over for the future ratoon cane.

[TO BE CONTINUED.]

THE CULTIVATION OF CHILLIE PEPPERS.

Referring to our article in the June issue of the Journal on chillie-growing, a correspondent desires further information on the subject. We cannot do better than show what is being done in countries where chillie-growing is a settled industry. The information is given in "The Mexican Investor":—

How Plants are Grown.

A hot bed is made by excavating about 16 inches deep; fill in to within 4 inches of the top with damp stable manure, tramping down very solidly. Spread about 4 inches of sandy loam over the manure. The seed is sown quite thickly over the loam, and then about ½-inch of loose sandy soil placed evenly over it, and all kept damp. When the plants have two or three leaves, thin to 1½ inches apart each way. The plants must be watered while in the hot bed by sprinkling. Great care should be taken to protect from frost.

Soil and Preparation.

Rich sandy loam is the best for the chillie pepper. It should be ploughed deeply, and be put in a state of thorough cultivation. Ridges should be made 3 feet apart, and the plants set 2½ feet apart on the ridges. All plants must be on a water-line, and to get this the ridges should be made, water run down the furrows, and the plants about 2 inches above the water-mark. This insures every plant receiving water when irrigated. Plant as soon as danger from frost is over.

Cultivation.

Frequent cultivation is necessary until the plants get too large to allow of a cultivator and horse passing between the rows. All weeds must be pulled out. When the plants are set as above noted, all the ridges will be on one side. This must be worked down with a cultivator, and then a plough used to throw earth on either side of the furrow, so that the plants will be midway on the ridge.

Irrigation.

While the plants are small, water will be needed about once in 20 days, but as they get larger it will be needed as often as once a week, though only in small quantities. The plant seems to have no deep roots; consequently, the surface soil must be kept damp.

Picking.

The field should be gone over about once a week after the peppers begin to ripen, all that are fully ripe being taken off. Great care must be exercised to pick all the stem with the pepper. They should be allowed to lie in the sun one day after being picked, in order to toughen the stems and prevent them breaking during the process of curing.

Stringing.

The common method is to cut strings of strong smooth twine 8½ feet long. Draw this through a needle about 12 inches long, which is often made of a bicycle spoke. Peppers having any breaks or blemished must be thrown away, as they would decay before drying properly. Of course, where an evaporator is used these can be saved. After the strings are full and tied they are hung on nails driven into a rough pole or other framework, standing about 6 feet from the ground, and left until dry; or, if shelter is available, they may be moved before becoming fully dry, and hung closely together under such shelter, but where there is a free circulation of air.

Evaporating.

Many growers prefer evaporating instead of drying. The evaporators used are of various designs and sizes, but they should be large enough when

the peppers are dried on strings to hold not less than 500 strings. The usual plan is to have a furnace with several turns of 8 to 10 inch pipe in the basement, the peppers being placed in the second story over a very open floor with a good ventilation. The temperature must be kept at 110 degrees Fahr., and in this way the house can be refilled about every four days.

Yield and Price.

Both of these, of course, vary with the season, soil, and water supply. Two hundred and fifty strings of 5 lb. each is called a paying crop; but, with all conditions favourable, including a late, warm season, as high as 400 strings or even 2,400 lb. per acre of dried peppers may be grown. Prices range from 70 cents to 1·50 dollars per string if sun-dried, and 15 to 25 cents per lb. if evaporated.

RAMIE.

The manufacturing world is still keeping an eye on ramie, a plant which produces the best of all textile fabrics. Neither cotton, wool, nor linen can compare with it, but, unfortunately, there has always been the difficulty in getting machinery to decorticate and degum it thoroughly and easily to make it ready for the mills. Mrs. Ernest Hart gave a lecture on ramie to the Society of Arts, London, on Wednesday, 4th April. Under the name of A. H. Hart and Co., she has mills at Bunbeg, Yorkshire, England, where are turned out fabrics which yield to none other in beauty of design and colour. She turns out dress fabrics, tapestries, muslins, upholstery, webb for underclothing, blue and crimson, with the sheen of silk and the strength of cotton, all woven of ramie. The Indian Government ten years ago offered premiums for ramie cultivation, but, as they linked their offer with the condition that a perfect decorticating machine should be found, no one succeeded in earning the prizes, which were ultimately withdrawn. With the exception of the material used on the mills under notice, where they have solved the problem, all that is imported into Great Britain comes from China, where labour is cheap, and the patient Chinaman decorticates and degums by hand, and turns out the best fibre on the market. From £34 to £38 per ton is the market price of China grass (the commercial name of ramie), and even at that price it cannot be bought in the open market, but must be ordered for delivery three months in advance.

Some years ago the subject of ramie-growing occupied our attention here. It was proved that four crops could be taken off per year at least, that it grew very readily, required rather a moist climate, that the fibre was good; but none of the decorticating machines put forward was effective, so the matter has been dropped until such a machine is invented. In case of developments at any time, those who have been formerly interested in it should keep a nursery of plants growing, as the instant there is an effective machine put on the market there will be a large call for it, and it will then be worth trying commercially.—"Journal of the Jamaica Agricultural Society."

[We commend the advice given in the last paragraph of this article to those interested in ramie-growing in Queensland.—Ed. "Q.A.J."]

RAMIE IN INDIA.

From the "Journal d'Agriculture Tropicale" for June we glean some information of the progress of ramie cultivation in Bengal, from the pen of M. Jules Karpelés, an exporter of indigo, and founder and managing director of the Bengal Rhea Syndicate, Limited. It appears that for a long time results were not as satisfactory as could be wished, either in respect to cultivation or in the important business of decortication of the stems. At last,

however, things would seem to be progressing well. The decorticators used by the syndicate are of French make, presumably the Faure machine.

The syndicate began experiments in 1900, at Dalsing Serai, in the district of Durbungah. The results were very encouraging, and contracts were entered into between the syndicate and certain planters in the district (nine contracts were made, representing an area of 3,700 acres). According to the agreement, the growers were to produce the ramie stalks, and the syndicate to supply the necessary machines for producing the fibre in commercial form. On 10th January, 1906, M. Karpelés reported to the Indian Government as follows:—

"At the outset there was considerable difficulty in procuring the necessary quantity of plants to establish the plantations. Some small lots of stocks (rooted plants) were certainly obtained from various localities, notably from Assam, and from sundry Indian botanical gardens, but these supplies were insufficient in quantity, and often of bad quality; it, therefore, became necessary to establish on each farm a nursery for the multiplication of rhizomes.

"The plantations suffered much from the attacks of white ants, which rapidly destroyed the young roots, and especially the cuttings. The planting of cuttings, however, during the rainy season, obviated, to some extent, this inconvenience, but still the best method of reproduction is the division of the rooted plants. Portions of the rhizomes may be taken from one to two year old plants without injuring them.

"It was evident from the commencement that successful plantations could only be established on light, porous soils; saltpetre and alkali soils are not conducive to the successful production of ramie. On well-cultivated lands, where noxious weeds had been carefully eradicated, every foot produced annually 15 to 30 stalks, about 5 feet in length, whilst in a field left as an experiment without cultivation produced only from 2 to 5 stems per plant; the plot in the same field, called the 'control plot,' which had been weeded and cleaned, gave 10 to 15 stems. It will thus be seen that a ramie field must be well cultivated; in spite of the increased expense, the field having to be cleaned by hand labour to avoid damage to the roots and young shoots.

"In three-year-old well-cultivated fields, no sign of soil exhaustion has yet been observed, although the upper part of the root has a tendency to become woody, to the detriment of the development of new stems. To overcome this, it is intended to remove the lignified portion every year, in order to rejuvenate the plants. Experience alone will decide if this is a good idea.

"Ramie is a very exhausting crop, and, therefore, the question of manure must be carefully studied, for unmanured plants yield a very poor crop. Good results were obtained by the use of indigo refuse. It is said that the refuse of ramie itself, such as the leaves, bark, and wood, constitutes a perfect manure, sufficient to restore to the soil the constituents taken out of it by the crop. But, up to the present, no experiments in this direction have been possible, as nowhere has the decortication of the stems been carried on in a systematic manner. However, at Dalsing Serai, a manure consisting of decomposed ramie refuse was applied to the experimental plots with excellent results. It has not yet been determined what quantity of such manure is needed. At Dalsing Serai and Mooktapore, where respectively 60 and 40 acres are in full bearing, there is a sufficiency of fermented material which will be utilised for manure. The leaves, separated from the stems when the latter are cut, are left on the ground, and these form a good mulch for the roots, at the same time supplying a manure.

"Ramie requires a great deal of moisture to properly develop, but water must not be allowed to remain too long on the ground, as the rotting of the roots would probably be thus caused. This was the unfortunate experience on plantations established on the low, flat country, where, last September (1905), many hundreds of acres were destroyed in consequence of the heavy rains. Ramie requires at least 45 inches of rain per annum. Two plantations had to be abandoned in a district where the annual rainfall did not exceed

35 inches. Consequently, cultivation was only carried on on seven plantations, representing an aggregate area of 3,100 acres, of which 1,950 acres were planted up to February, 1906. The remaining 1,150 acres will, we are told, be planted during the next rainy season.

"It is very important to cut the stems at the proper time. If they are cut too soon, they yield a very fine fibre, but in small quantity; if cut too late, the decortication becomes more difficult and the fibre is brittle. The best time to cut, says M. Karpelés, is when the base of the stem is of a brownish tint for a height of about 10 inches. The stems must be worked up immediately they are cut. The decortication is much more readily performed if carried out within twelve hours of the cutting. When they have been allowed to dry, decortication is more difficult, and the fibre is inferior. If circumstances render it necessary to defer decortication, the stems, having the leaves removed, are made into little bundles of thirty or forty, and preserved in water, where they will remain unchanged for forty-eight hours.

"Fibre containing 30 per cent. of gum does not easily dry in the climate of Bengal. The syndicate has, therefore, been obliged to have special drying apparatus constructed in Paris, and installed on each plantation. The fibre on leaving the decorticating machine passes first through a centrifugal drier, made by Dehaitre, which removes 70 per cent. of the water it holds. It is then hung up in a large closed-in straining-room, supplied with a current of warm air, set in motion by a fan.

"The fibre, when ready, must be at once baled, for it readily absorbs a quantity of fresh moisture from the air, which would soon produce fermentation and mouldiness. At Dalsing Serai a hand press is used.

"A 20-h.p. engine is sufficient to drive all the machines required for 500 acres. As the fibre has to be washed as it passes through the decorticators, a good and sufficient water supply is indispensable.

"The fibre must not be twisted, as this imparts to it a permanent undulation which depreciates it from the spinner's point of view.

"Many samples of ramie fibre produced by the syndicate were sent to Europe to several spinners. They were considered quite equal in quality to China grass, and very shortly orders were received totalling 1,500 tons. Some 20 tons of better quality fibre, more carefully prepared than hitherto, have been lately exported from the syndicate's estates.

"From a forecast of the next year's crop (1906) the syndicate should be in a position to deliver at least 200 tons of fibre from the 1,950 acres already under cultivation. This is said to be a very moderate estimate, since the normal production from this area will be, it is estimated, 800 tons when in full maturity.

"It is the intention of the syndicate, in the near future, to degum the fibre as well as decorticate the stems, in order to save the freight charges on 30 per cent. of gummy substance contained in it. But, as every spinner of ramie has his own particular method of degumming, all of them require the fibre to be delivered to them without its having been subjected to any chemical treatment. It is hoped, however, that flax spinners will some day take up ramie as well, and will accept the fibre degummed on the plantation."

From the above account of the operations of the Bengal syndicate, we can form some idea of the initial difficulties to be encountered in entering upon ramie cultivation. After six years' work, the company has 1,950 acres under cultivation, from which they have obtained 20 tons of fibre, and possibly 200 tons will be the result of the 1906 crop. Two hundred and twenty tons is not a large return from such an area. The expenditure on over 3,000 acres must have been very considerable during six years. With cheap and abundant and reliable labour, the necessary humid climate, and abundant water supply, and

cheap water carriage, one would have expected far greater results. Ribbons are worth £14 per ton in the English market. Clean, degummed fibre is worth £50 per ton. Clean, undegummed fibre from the plantation is worth about £24 per ton in London. At this latter price, 220 tons would be worth £5,280, or a return of £880 per annum spread over the six years since commencement. Decorticating machines, motive power, expenses of management, labour, freights, &c., have all to be deducted.

Mr. J. Macdonald (of Macdonald, Boyle, and Co., London) estimated the cost of 900 acres of ramie under cultivation from planting to extraction of the fibre at £6,477 17s., and the machinery at £6,775.

At the end of the first year the product might be estimated at 450 tons of clean fibre ready for the manufacturer. This, at 4½d. per lb., amounts to £18,900. Deducting the cost of production as above, also £900 for freight and £260 for brokerage and incidentals, a working profit remains of £11,262 3s.

This estimate, so extremely sanguine, was based on a three and a-half to four years old ramie plantation. Yet, Mr. Macdonald begins operations six months after planting! An obvious discrepancy. Practical men would be better pleased to see a well-considered moderate statement work out a possible profit of £5 per acre than to be met with £12 profit per acre the first year, and well nigh £50 in the second, from a cultivation which, so far as we know, no one has yet tried, except the Bengal syndicate above described, on a scale sufficiently large to justify reliable estimates for a plantation, at any rate in the Eastern world.

Queensland planters would not be likely to drop sugar, cotton, pineapples, &c., for a return of £880 per annum from 1,950 acres, and from which return heavy expenses have to be deducted.

SISAL CULTURE IN QUEENSLAND.

We have received from the author, Mr. T. H. Wells, of Farnborough, Childers, a concise, well-written, and what is equally important, a well-considered pamphlet on the "Possibilities of Sisal Culture in Queensland." Mr. Wells is practically acquainted with this particular industry, and was at the trouble and expense of a journey to Hawaii, with the object of studying the methods of cultivation and production of fibre in that country. It may be gathered from the author's remarks on his observations in Hawaii that Queensland planters, notwithstanding labour conditions, will be able to successfully compete with cheap labour countries in the production of this fibre. The demand for it is ever increasing, and the price is high enough to induce even small farmers to plant a few acres, provided they are within easy distance of a central factory. Mr. Wells has done much to show how the industry would benefit this State. He has a considerable area planted, and machinery is now on the way from England with which he will make an early start on his oldest plants. During the late heavy rains, some sisal planters here feared that the plants would suffer, seeing that they demand a hot, dry climate, with a moderate rainfall. It is, therefore, satisfactory to read that, "though excessive rains no doubt are not beneficial to sisal, except to make it grow faster, they are not very injurious if the land is naturally drained; but sisal does not like wet and waterlogged land. . . . It is the fair to good lands, especially to those of limestone origin, situated in dry districts, to which we should, I think, turn our attention for sisal-growing."

We regret that we have not space to give our readers a more extended summary of Mr. Wells's pamphlet, but we advise all who are growing or who

purpose to grow sisal to obtain a copy, and to give good heed to the instruction it contains as coming from a practical planter. The price of the pamphlet is 5s. This seems a rather high price, but, as the author truly says, "it will be obvious that it is better to pay for advice than to waste money for the want of it."

COTTON NOTES.

Cotton Mills and the Price of Cotton.

The British Cotton Growing Association has published a pamphlet (No. 8, April, 1906), entitled "Notes on Cotton Cultivation and other Agricultural Matters in the Southern States of the United States of America," which contains matter of the greatest interest to cotton-growers in Queensland. Amongst other items we read that Professor Redding, of Griffin, Georgia, is of opinion that unless an increase in yield of American cotton occurs none will be sent to England in a few years' time, as the American cotton mills are yearly increasing in number, and even now take a large proportion of the crop. At Griffin alone there are seven large spinning mills. The length of one of these mills is 600 feet, which will give an idea of their size. The farmers realise that the price of cotton this year is not likely to fall, owing to the short-crop prospects. It is scarcely expected that the crop this year will exceed 10,300,000 bales, which it is thought is insufficient for the mills' supply, and may cause the present price to rise. At a recent meeting of cotton spinners and growers in Alabama it was decided to fix the selling price (of Uplands cotton) at 11 cents (5½d.). It will be December before the crop figures will be accurately known, and when the price may probably rise to a great degree.

Cotton-picking Machines.

The writer of the British Cotton Growing Association's pamphlet on "Cotton Cultivation in the United States of America" (whose name, by the way, is not appended to the notes) writes thus on the subject of cotton-picking machines:—

"The only gentleman I met who held out any hope for the development of cotton-picking machinery was Professor Duggar, of Auburn, Ala. In the previous year Professor Duggar had been invited to inspect the operation of Lowrie's machine, which was being tried at Montgomery, Ala., and he seemed to think that the correct idea had been reached, and would be further developed. The inventors promised that they would have a system of further trials this season, but up to the time of my visit Professor Duggar had not received any invitation to attend, which had been promised to him. The description of the machine was as follows:—On a motor-propelled vehicle travelling between the cotton rows two men were carried on each side, back to back, with a receptacle for the seed cotton at their backs; then by means of armlike troughs, in which ran endless belts fitted with hooks on the one side, the cotton was picked out of the opened bolls by the extremities of the arms being directed towards them. Each man controlled two such arms, and the cotton was removed from the hooks by a wheel brush, which revolved several times quicker than the hooked belt. The amount of cotton picked in this way by four men was equal to the work of eight average men working with their hands alone. This does not appear to me to be sufficient to compensate the cost of running the machine, nor the loss which would be incurred by having to plant the cotton wider apart. In many of the cotton fields I saw, no machine could possibly pass down the lines without destroying a number of branches, as the spaces intervening between the lines was in many cases completely covered. I could not find anyone else who had seen the machine, nor who regarded picking machines as practicable.

Plate XXIV.

Thomas' Stumping Machine at Work at Petrie's Creek.

SEA ISLAND *v.* UPLAND OILCAKE.

Where Sea Island cotton is almost exclusively grown, as at Blackshear, Georgia, the treatment of the seed is slightly different from that employed in the Upland districts. Here the cotton seed is ground without removing the hull from it, and the consequence is that the Sea Island seed cake is of inferior quality and of a darker colour. The meal from Sea Isand cotton is also less economical for the manufacture of chemical fertilisers, as it only contains from 3 to 4 per cent. of nitrogenous matter, whereas that of Upland seed has from 7 to 9 per cent. The Sea Island cake is not appreciated so much for the feeding of stock as the Upland cake. It is apparently difficult to remove the shells from the Sea Island seed, although this seed comes from the linter almost denuded of all fibre; the Upland seed is always more or less woolly.

LINTERS.

The woolly seed from the ginneries is fed into a linter saw-gin, which takes off the short fibre left on in the first ginning. This linter gin has the saws set very closely, and these take off a good deal. About 200 lb. of short lint per ton of seed is the usual quantity. As the short lint is taken off it is fed into a condenser, and is passed between rollers on to a steel core, which revolves slowly and winds off the cotton lint in the form of a compressed bat about 1 inch in thickness, forming into a cylindrical roll.

HOW COTTON IS PICKED IN LOWER TEXAS.

Cutivation is similar to that employed elsewhere. Most of the land being held by tenants on the half system, the picking is largely done by the tenants themselves and their families. These may be Germans, Swedes, Americans, Mexicans, or negroes. The two first-mentioned usually buy themselves farms after a few years, and sublet to others what they cannot themselves cultivate. The cost of labour, where paid by the day, is generally 75 cents (3s. 1½d.) per day for all works; but in the present busy season, when men are scarce, for hauling, threshing, and ginning, 1 dollar 25 cents (5s. 2d.) is being paid. Cotton-pickers are paid 40 cents (1s. 8d.) to 60 cents (2s. 6d.) per 100 lb. As there is no system to prevent the enticing of labour from one district to another, and no written labour contracts, a good deal of loss is incurred by labour being shipped out of the county by other employers at the times when they are most needed; this is the chief cause of the fluctuation in the wages. In the employment of convict labour, prisons and houses for the warders have to be supplied. The employer then pays the Government 21 dollars (£4 4s.) per month for every negro man supplied, but does not pay the warders, who are under his direction, and perform the duties of overseers. There is one warder for every ten men, and each is mounted and armed with a rifle. In addition there is a sergeant, called the captain, who takes his orders from the proprietor of the estate. There were 75 prisoners and 100 mules working 1,500 acres of cotton at Pierce, and the crops were in fine condition, and would probably yield about 1,300 bales. The mules and the implements were supplied by the proprietor.

STUMPING MACHINE AT WORK.

On Mr. Nicol's farm, at Petrie's Creek, the very simply constructed stumping machine, shown in the illustration No. 11, did excellent work during a visit we paid to that gentleman's farm in January, 1903. The machine is the invention of Mr. Thomas, of Diddlibah, and consists of a windlass, blocks, and wire rope tackle—an apparatus which can be obtained for £12. The side roots of the stumps are cut, the tackle fixed to an "anchor" stump, and thence to the stump to be extracted, as here shown. One young fellow heaving at the windlass easily hauled two large, green ti-tree stumps simultaneously clean out of the ground.

Chemistry.

ELEMENTARY LESSONS ON THE CHEMISTRY OF THE FARM, DAIRY, AND HOUSEHOLD.

By J. C. BRÜNNICH, Agricultural Chemist.

Fifteenth Lesson.

Organic Acids and their Salts; Benzene or Aromatic Compounds, Essential Oils, Camphors, Resins, Glucosides, and Vegetable Colouring Matters.

Carbon compounds possessing the properties of acids are found widely distributed in plants, not only in a free state, but also in the form of various salts. These **organic acids** are, as a rule, soluble in water; some are volatile, others are non-volatile. These acids and their salts are decomposed when plants are burnt, and the salts are changed into carbonates. The juice of most growing plants has an acid reaction, which can easily be proved by testing such juices with litmus paper (*Experiment 98*). The well-known weed, sour grass (*Oxalis*), has a particularly sour taste; again, unripe and also many ripe fruits contain a large amount of acid. Limes, lemons, and other citrus fruits contain from 5 to 7 per cent. of acids. Large amounts of organic acids are also found in the roots and rootlets of plants, and these acids most probably aid in the decomposition of the soil and help to extract mineral plant foods from the soil.

As already explained in our 13th Lesson, organic acids are oxidation products of alcohols, and contain one or more of the characteristic radicle

$-C\begin{matrix}\nearrow O \\ \searrow OH\end{matrix}$, **Carboxyl group,** in combination with hydrocarbon radicles.

Formic acid, $H-CO-OH$, occurs in the hairs of the stinging nettle; in many fruits, as tamarinds, unripe grapes; also, in many animal fluids, as in ants, in the poison of the bee-sting, &c. It is a colourless volatile liquid, with a very pungent smell, and the liquid blisters the skin. Honey contains small traces of formic acid, which prevents fermentation and growth of mildew.

Acetic acid, CH_3-COOH, is found in small quantities in a free state and also in the form of salts, called *acetates*, in plants. It is obtained in large quantities by the oxidation of alcohol (*acetous fermentation*), and also by the destructive distillation of wood and sawdust (**pyroligneous acid**). Liquids containing small amounts of alcohol, as wine, beer, cider, &c., when exposed to the air, are liable to become sour. This change is caused by the active growth of a peculiar microscopic organism, "**vinegar cells,**" "**mother of vinegar**" (*Mycoderma aceti*), in accordance with the following chemical equation:—

$$\underset{\text{Alcohol.}}{CH_3 - CH_2OH} + O_2 \xrightarrow[\textit{Mycoderma aceti}]{\text{in presence of}} \underset{\text{Acetic acid.}}{CH_3 - COOH} + H_2O.$$

This process of oxidation takes place much more rapidly by exposing a greater surface of the alcoholic liquids to the air (*quick vinegar manufacture*), by allowing the fermented liquids to trickle over wood shavings previously saturated with acetic ferment packed into casks.

In accordance with the raw material from which the vinegar was produced, we speak of malt vinegar, honey vinegar, wine vinegar, &c. A good vinegar should contain about 5 per cent. of acetic acid. Pure vinegar exposed to the air becomes mouldy, with a decomposition of the acetic acid; in order to prevent this, the manufacturer add frequently to the commercial vinegar small amounts of sulphuric acid, not more than 1 part to 1,000 parts of vinegar.

Pure acetic acid is a colourless liquid, having a pleasant sharp odour; the strong acid blisters the skin. The acid boils at 244° F., and the vapours burn like alcohol. A strong pure acid crystallises at about 63° F. to a ice-like solid (*glacial acetic acid*).

The salts of acetic acid, **acetates**, are largely employed in the arts. Most of the salts are soluble in water; they all give, when warmed with sulphuric acid, the peculiar smell of vinegar (*Experiment* 99).

Lead acetate, or **sugar of lead**, a common commercial product, is obtained when litharge (PbO) is dissolved in acetic acid:

$$2CH_3 - COOH + PbO = \begin{matrix} CH_3-COO \\ CH_3-COO \end{matrix}\!\!> Pb + H_2O.$$

Verdigris is a mixture of several basic copper acetates. Both salts are very poisonous.

Oxalic acid, $\begin{matrix} COOH \\ | \\ COOH \end{matrix}$, is found in most plants, as in sour grass, sorrel, rhubarb, &c., frequently in the form of very minute crystals (*raphides*), as the lime salt. This acid is the strongest of organic acids. The acids and also its salts are poisonous. Oxalic acid forms white prismatic crystals, easy soluble in water and in alcohol. The solution may be used for the cleaning of straw hats, removing of ink stains and of iron mould from linen, cleaning of brass. The lime salt, **Calcium oxalate**, $\begin{matrix} COO \\ | \\ COO \end{matrix}\!\!> Ca$, is insoluble in water, and for this reason oxalic acid is used as a reagent for lime salts (*Experiment* 100); and, again, lime (in the form of chalk, whiting, lime water) is used as an antidote in the case of poisoning by oxalic acid or its salts. Oxalic acid is a dibasic acid, and consequently can form two distinct potassium salts: A *normal potassium oxalate*, $\begin{matrix} COOK \\ | \\ COOK \end{matrix}$, and an *acid* salt, $\begin{matrix} COOK \\ | \\ COOH \end{matrix}$, *potassium binoxalate*, or **salt of lemon or salt of sorrel.**

Malic acid, $C_4H_6O_5$ or $C_2H_3(OH)(COOH)_2$, occurs in the unripe berries of the mountain ash, also in gooseberries, apples, plums, and other fruits; in the form of its lime and potassium salts in cherries, rhubarb, and in tobacco.

Tartaric acid, $C_4H_6O_6$ or $C_2H_2(OH)_2(COOH)_2$, is found associated with malic acid and other acids in most fruits, more particularly in grapes; and during the fermentation of the grape juice the acid is deposited, by forming crystalline crusts of **tartar** or **argol**, an impure **cream** of **tartar**, $HKC_4H_4O_6$, a *hydropotassium tartrate*, an acid salt. Tartaric acid forms white prismatic crystals. When treated, the crystals will melt, then turn brown, and finally black, at the same time evolving the peculiar smell of burnt sugar (*Experiment* 101).

Seidlitz powder, the well-known saline aperient, consists of two powders—one in the blue paper containing 2 drachms of *Rochelle salt* (a potassium sodium tartrate) mixed with 40 grains of *bicarbonate* of soda; and the second in a white paper containing 35 grains of *tartaric acid.* The contents of the blue paper are dissolved in a tumbler of water, the powder of tartaric acid is now added, producing a cool, strongly effervescing drink.

Both malic and tartaric acid are derivatives of *succinic acid*, $C_2H_4(COOH)_2$, produced by the distillation of amber, and also found in small quantities in wine, beer, vinegar, &c. Malic acid has one hydroxyl group, OH; and tartaric acid two such groups, replacing hydrogen atoms in succinic acid.

Citric acid, $C_6H_8O_7$ or $C_3H_4(OH)(COOH)_3$, is found in many plants and fruits associated with the previous acids, more particularly in lemons, limes, oranges, gooseberries. It forms colourless crystals, easily soluble in water, the solution having a pleasant acid taste. Citric acid is a tribasic acid, having three COOH groups, and forms consequently three potash salts. The lime salt calcium citrate is less soluble in hot than in cold water, and the acid may be thus distinguished from oxalic and tartaric acids (*Experiment* 102).

Some other organic acids have already been mentioned in a previous lesson: the fatty acids, *stearic*, *palmitic*, and *oleic acid*, which are the basis of

fats and oils. A few other organic acids again will be treated in a future lesson, which will deal with the organic compounds characteristic to animal life.

As a separate branch of organic compounds are to be considered the numerous class of compounds belonging to the **Benzene** or **aromatic series**, so called because many of its important members, first discovered, belong to the aromatic oils and resins.

Benzene, C_6H_6, a hydrocarbon, composed of the hexavalent benzene or benzol ring of six carbon atoms (figure IV. of the diagram given in the 13th Lesson) united with six hydrogen atoms, is the parent of these compounds, and is obtained from the light oils in the distillation of coal tar. It is a volatile and very inflammable liquid, having a peculiar odour of coal gas. It is a very good solvent for fats, oils, caoutchouc, and indiarubber, &c. When treated with nitric acid, a violent reaction takes place, and oily drops of **Nitrobenzene**, $C_6H_5NO_2$, which have a powerful odour of bitter almonds (*essence of mirbane*), are produced (*Experiment* 103).

By reducing nitrobenzene a new substance, **Aniline**, $C_6H_5NH_2$, or *amido-benzene*, may be produced, which is a very strong basic compound, and is the raw material of the numerous *aniline colours (Experiment* 104).

From the aromatic hydrocarbons numerous compounds, as aromatic acids, phenols, alcohols, ethereal oils, &c., are derived.

By substituting the hydroxyl group (OH) for one of the hydrogen atoms in benzene we obtain the *Benzyl alcohol*, $C_6H_5(OH)$, generally called **Phenol**, or **Carbolic acid**, a well-known poisonous liquid largely used as an antiseptic, as it arrests fermentation and putrefaction. This compound is only slightly soluble in water, but easily soluble in alcohol and ether.

A similar body is **Cresol**, $C_6H_4(CH_3)(OH)$, or *methyl phenol*, which is also found in coal tar. **Kreasote** is a mixture of phenol and cresol. The substances **Lysol** and **Creoline**, frequently used as disinfectants and cattle washes, are all prepared from crude cresol.

Benzoic acid, $C_6H_5 - COOH$, is found in many aromatic smelling gums and resins, chiefly in *gum benzoin*, which contains up to 14 per cent. of benzoic acid.

Salicylic acid, $C_6H_4 - (OH) - COOH$, a *hydroxy benzoic acid*, has been found in the flowers of the garden—pansy and meadow sweet—and as a methyl salt in the *oil of winter green*. Salicylic acid is used in medicine, and also as an antiseptic.

Tannins, or **tannic acids**, are found widely distributed in plant life; they all have the property of precipitating gelatine, and thus change hides into leather (*Experiment* 105). One of the best known members of this group of acids is **Gallo-tannic acid** or **Digallic acid**, $C_6H_2(OH)_3CO—O—C_6H_2(OH)_2$ COOH, found in gall nuts and many other tanning materials. A solution of this acid has a strong astringent taste, and gives with iron salts a bluish-black precipitate **(ink)**. With ferrous salts the solution will give at first a dirty white precipitate, which gradually on exposure to the air turns black (*Experiment* 106).

Gallic acid, $C_6H_2(OH_3)COOH$, can be obtained on hydrolysis of tannic acid by boiling tannins with dilute sulphuric acid. This acid does not precipitate gelatine, but gives a dark-blue black precipitate with ferric salts.

Essential oils, camphors, resins, and **balsams.** These organic compounds are found widely distributed in plant life, and are the cause of the characteristic odour of many plants. Some of the essential oils are simply hydrocarbons, like **oil of turpentine, oil of lemon, oil of bergamotte,** &c., which are all **terpenes** of the formula $C_{10}H_{16}$. Others, again, are oxidised hydrocarbons of the nature of aldehydes and alcohols, like oil of cinnamon, **menthol**, $C_{10}H_{19}OH$, **camphor**, $C_{10}H_{16}O$, &c.: and a third class, again, contain sulphur in their composition, as, for instance, **oil of garlic, oil of mustard,** &c.

The essential or ethereal oils are extracted from fruits, leaves, flowers of plants by distillation with steam, or, again, by extracting the oils with alcohol, or with oils and fats or other solvents. These oils are insoluble in water, but

soluble in alcohol, ether, bisulphide of carbon, &c. Exposed to the light, they generally form resinous compounds. They all burn with a smoky flame.

Indiarubber, or Caoutchouc $(C_5H_8)n$, belongs to family of terpene hydrocarbons, and is produced from the milky exudation obtained from many tropical plants.

Camphor, $C_{10}H_{16}O$, is an oxidised hydrocarbon produced by distilling branches of the camphor laurel-trees with steam.

Balsams are mixtures of essential oils and resins. **Venice turpentine** and **Canada balsam,** both obtained from pines, are solutions of common *resin* or *colophony* in oil of turpentine.

Hard resins contain less terpenes, but more of the oxidised compounds of the aromatic series, and they have frequently an acid character. Some of these resins, like **Copal, Dammar, amber, &c.,** are of great importance for the manufacture of *varnishes*, which are simply solutions of hard resins in alcohol or some other solvent, like acetone, &c. These varnishes contain frequently small amounts of turpentine and some other oils to prevent them from cracking when becoming thoroughly dry and hard.

Gum resins, again, are mixtures of various resins and gums, and are found as exudations on many of our eucalyptus trees. Many of the aromatic resins and similar substances are not found in a free state in plants, but in combination with other chemical compounds. The great group of **glucosides** represents such compounds in combination with sugars. Under the action of certain ferments the compounds split up, one of the products of decomposition being a glucose.

Salicin, $C_{13}H_{18}O_7$, is the bitter principle extracted from willow bark.

Amygdalin, $C_{20}H_{27}NO_{11}$, is the peculiar poisonous principle found in bitter almonds, in the kernels of plum and cherry stones. It is also found in peach leaves. In the presence of water and a characteristic albuminous ferment, *emulsin*, always present in almonds, this glucoside splits up under liberation of the extremely poisonous hydrocyanic acid:

$$\underset{\text{Amygdalin.}}{C_{20}H_{27}O_{11}N} + 2H_2O \left\{\begin{array}{l}\text{in presence}\\ \text{of emulsin}\end{array}\right\} = \underset{\text{Benzaldehyde.}}{2C_7H_6O} + \underset{\text{Glucose.}}{2C_6H_{12}O_6} + \underset{\text{Hydrocyanic acid.}}{HCN}$$

Similar poisonous glucosides are found in a great number of plants; for instance, in the roots of both bitter and sweet cassavas, in the young stems of various grasses belonging to the sorghum family, and in maize, in some varieties of beans, in sweet potato vines, &c., &c. Other poisonous glucosides are:

Digitalin, the poisonous principle of foxglove seeds; **Saponin,** found in soap root (*Saponaria officinalis*), in the roots of carnations, in the seeds of horse chestnuts and of our Moreton Bay chestnut.

This glucoside is soluble in water, and its solution forms a lather-like soap.

Other bitter principles, like *quassin* from quassia chips, *santonin*, *gentianin*, *aloin*, the extract from bitter aloes, resemble the glucosides in their composition.

Vegetable colouring matters. These substances are found either in solution in the cell sap or, again, in the form of minute grains. Some of these colouring matters exist as such in the plant tissue; others, again, are only produced after being acted upon by alkalies and oxygen; and a third class is of the nature of glucosides.

Chlorophyll is the green colouring matter of plants, but has never been isolated in an absolute pure state. It may be extracted from green leaves by boiling them with alcohol. Iron seems to be an essential constituent of this compound. Chlorophyll itself seems to be composed of a yellow and a blue colouring matter; the peculiar change of colour of some leaves during autumn is due to the disappearance of the blue colouring matter.

Annatto is a yellow vegetable colouring matter obtained from the pulp of the fruit of a West Indian shrub; it is used for the colouring of cheese and butter.

Turmeric is the yellow colour obtained from the roots of an East Indian plant, which with alkalies produces a red colour.

Indigo blue is not found as such in plants, but as a colourless compound, *indican*, which, under fermentation, is changed into *indigo white*, and this again by oxidation into indigo blue. Indigo blue has also been produced artificially from aniline, the by-product of coal tar.

Alizarine is an important vegetable dye obtained from the roots of madder.

Litmus is obtained from certain lichens. This blue colour is used as a sensitive indicator for the volumetric determination of acids and alkalies, as the acids change the colour into red, which again is changed to blue with an excess of an alkali (*Experiment* 107).

Appendix to Fifteenth Lesson.

Experiment 98.—Bruise various green plants, and extract some of the sap with a little water, and test for acidity with litmus paper.

Experiment 99.—Heat some sugar of lead or some acetate of soda with a little dilute sulphuric acid in a test tube.

Experiment 100.—Add oxalic acid or a solution of an oxalate to lime water or to a solution of chloride of lime. A white precipitate of oxalate of lime is produced, insoluble in acetic acid, but soluble in hydrochloric acid.

Experiment 101.—Heat tartaric acid in a test tube.

Experiment 102.—Add an excess of lime water to a solution of citric acid. No precipitate or only a very slight one is produced. When heated to boiling, a heavy precipitate will be formed, which will dissolve again on cooling.

Experiment 103.—Warm about ½ oz. of fuming nitric acid or a mixture of equal parts of strong sulphuric and nitric acid in a beaker, and add in small quantities at a time about the same quantity of benzene. [Frequently ordinary gasoline or benzoline or benzin is sold as benzene or benzol, which would not give this reaction.] A violent reaction takes place, red fumes are evolved, and a red liquid is produced. By adding now a large quantity of cold water, a heavy oily liquid falls to the bottom, which has a powerful odour of bitter almonds. This oil may be purified by washing with water containing a little caustic soda.

Experiment 104.—Cover some granulated zinc contained in a test tube with strong hydrochloric acid, and add some of the prepared nitro-benzol; now heat, and a peculiar smell of aniline will become noticeable.

Experiment 105.—Make a solution of tannic acid or a decoction of wattle bark or of mangrove bark, and add to it a weak solution of gelatine or glue, when a flocculent precipitate will be produced.

Experiment 106.—Add to decoctions of gall nuts and other tanning materials, or to solutions of tannic acid and of gallic acid, solutions of ferrous sulphate or green vitriol, and again solutions of ferric alum, and note the different colours produced.

Experiment 107.—To litmus tincture add a few drops of dilute acids, and again a few drops of an alkali. Other colouring matters, like chlorophyll, the blue colouring matter in violets, and so on, may also be tested.

Questions to Fifteenth Lesson.

1. Which are the most important organic acids found in plants?
2. How are organic acids produced from alcohols?
3. Which acid causes the irritation produced by the stinging nettle and by the sting of bees?
4. How can acetic acid be manufactured?
5. What is mother of vinegar?
6. What is verdigris?
7. What are the peculiar characteristics of oxalic acid, and why can it be used as a test for lime?
8. What antidote should be given in the case of poisoning with oxalic acid or with a solution of salt of lemon or sorrel?
9. What crystalline substance is produced in wine casks after the wine is kept for any length of time?
10. Why can cream of tartar be used instead of tartaric acid for the manufacture of baking powder?

Note.—Baking powders are mixtures containing as active ingredients an acid and bicarbonate of soda which when mixed with the dough will produce carbonic acid gas.

11. What is benzol or benzene?
12. How is it that a great number of brilliant colours are produced from coal tar?
13. What is carbolic acid?
14. Which compound is the active principle in gall nuts, wattle and mangrove barks?
15. How can a writing ink be produced?
16. What are glucosides?
17. What is the difference between ethereal oils, resins, and gum resins?
18. Enumerate a few of the most important vegetable colouring matters.

Animal Pathology.

PREVENTION OF TUBERCULOSIS IN CATTLE.

The Department of Agriculture and Technical Instruction for Ireland has issued a leaflet on the above subject, dealing with the cause, spread, and prevention of the disease. The writer says:—

The Disease comes by Infection.

Until recently tuberculosis was believed to be a hereditary disease—a disease which the offspring of tuberculous parents could rarely escape, and which, if escaped, would reappear sooner or later in their descendants. The escaping generation, if it did not hand down the disease, handed down the tendency to contract it, and in their descendants this tendency developed into the disease itself! Thus, for the descendants of a tuberculous ancestry there was little hope. If they escaped the disease they carried with them the tendency to contract it.

These beliefs are now known to be wrong. An animal can become tuberculous only by infection with the germs of the disease. And not only so; there is no evidence that the offspring of tuberculous ancestors are more liable to the disease than the offspring of those that are sound. Experiments have shown that, by removing them from infection, individuals with a tuberculous ancestry may grow up sound and remain sound, whereas others with a sound ancestry, by being brought in contact with the disease, may become unsound.

How the Disease is Spread.

To know how to prevent tuberculosis we must know how an animal becomes infected, and how it infects others. There are two main pathways by which the germs of the disease enter the body—the nose and the mouth, with the breath or with the food and drink. The germs are living things, and, being alive, they must be fed. Their natural food is the living tissues of a living animal. Once in contact with living tissues the germs endeavour to feed upon them, and, if they succeed, the animal whose tissues are attached has contracted the disease. The germs multiply quickly at the points they have attacked, and at these places there arises an accumulation of the germs themselves and of the tissues destroyed. From these accumulations germs pass on to neighbouring tissues, or are carried sometimes to distant parts of the body. Thus the centres first attacked lead on to others, these to others still, and so on till in time the majority of the animal's glands and organs may be diseased.

The progress of the disease depends upon the resistance the animal is able to offer to it. This resistance depends upon the animal's inherited strength, and upon fresh air, food, shelter, and healthy exercise. In the earlier stages of tuberculosis a vigorous, well-nurtured animal may recover; in the later stages its chances are slender indeed. Thus the disease is usually less extensive in young than in old animals. It is also much less common among young than among older animals. The following is an estimate of the number of cattle affected at different ages in the United Kingdom:—Yearlings, 5 to 10 per cent.; two-year-olds, 10 to 20 per cent.; cows, 40 to 60 per cent.

It is unfortunate that, in its earlier stages, tuberculosis is not readily detected. An animal may have had the disease for years before being found out, and for some time it may have been spreading the infection. The earlier recognisable symptoms are that the animal ceases to thrive; its coat becomes dry and staring, and loses its oily feeling; the hide is less soft and pliable, and adheres more closely to the body; the eyes look sunken and dull. Later, these symptoms are accentuated, the belly becomes tucked up, and very often the animal has a hard, painful cough, and is unable to endure cold. Other

symptoms are swellings about the throat, continued looseness of the bowels, and rises in temperature. Among cows a frequent sign is that they abort, become uncertain, or cease altogether to breed.

It is when the disease is in the lungs or in the udder that an animal is most dangerous to others. When the lungs begin to break down the germs of the disease are scattered with every cough. If the diseased animal is in the house, then the walls, the floor, the feeding trough, and other parts near become spattered with infective materials. They are similarly spattered when the throat swelling bursts. These infective materials dry up, and a germ-laden dust is raised and tossed about with the very slightest breadth of air. Every other animal then living in the same house runs risk of contracting the disease. If there are more animals than one spreading the disease, then the risks to the others are increased. In a byre that has been tuberculous for years, the accumulated risk may become enormous.

In the case of tubercular udder, the risks are to those that drink the milk. A calf reared by its dam takes the whole risk. Calves, among whom the milk from a tubercular udder is divided, divide the risks among them. How many they are that take these risks may be calculated from the basis of one cow in every thirty or forty having a tubercular udder.

The udder of every cow should be examined, and if any cow's udder is tubercular her milk should be used no longer. Such milk is dangerous. A tubercular udder is detected first by feeling one or more hard little knots in the soft and flexible interior. As the disease proceeds these knots become larger and larger. The smallest knot is a sufficient warning.

How the Disease may be Prevented.

From the foregoing the steps that should be taken to prevent the disease are apparent. They are separation of the sound from the unsound and thorough disinfection of infected premises. Animals which from their outward appearance exhibit symptoms of tuberculosis should be cleared out at once. They are a certain source of infection to the rest of the herd; and they cannot be fattened or expected to breed. By the use of tuberculin it is possible to divide the remainder of the apparently healthy herd into those that are sound and those that are unsound. The former, as well as all young animals from which it is intended to breed, should as far as practicable be kept apart in order to obviate the danger of infection.

While those who take up seriously the question of ridding their herds of tuberculosis will find in tuberculin, when used with the above object, an excellent aid to the end they have in view, the simple process of thorough disinfection as a means of eradicating this disease is not only simple and inexpensive, but, if well done, effective. It should, therefore, be undertaken by every owner of breeding stock.

The byre or cowhouse must first be thoroughly cleared of all food, straw, litter, or manure. The disinfectant to be used is crude carbolic acid. Mix this in hot water in the proportion of one of acid to twenty of water. Stir until the acid is well mixed with the water; then with the hot mixture spray every part of the inside of the building until it is thoroughly saturated. The greatest attention should be given to the feeding-troughs and other parts near them which have been most breathed or coughed upon; but no part of the building—floors, walls, eaves, crevices, even the wood of the roof—should be omitted. The mixture can be sprayed with an ordinary garden syringe or with a spraying machine. The quantity required is about 1 gallon of the acid to every ten head of cattle—that is, 2 gallons of the mixture to every head; but the first time a place is disinfected it would be wise to use more. The disinfecting should be done once every year at least; preferably in summer when the cattle are on the pastures and the byres are empty. All doors and windows should be kept closed for eight or ten hours after the byre or cowhouse has been sprayed. If an animal shows signs of tuberculosis during the winter and has to

be removed, the part of the byre it stood in should be disinfected before another fills its place.

The man who is using the sprayer or syringe should keep his hands and arms well smeared with oil during the process.

The farmer who follows the above directions faithfully may reasonably hope to have his whole herd entirely sound in a few years; but his success will depend upon his keenness in singling out and isolating suspected animals, and in the thoroughness with which his premises are disinfected. It will also depend upon the care he exercises in introducing new animals, more especially cows, to his herd. If he is bound to buy in strange stock, he should treat them as suspects until he is assured they are sound.

If a farmer is unable to have the unsound in separate houses, then he can at least have them in separate ends of the same house, with as much space between them as possible. In such a case, however, the disinfection must be done oftener than once a year, and the unsound must be got rid of with the very shortest delay. But the same success cannot be looked for as with complete isolation.

But disinfection and isolation must never become an excuse for neglecting the remedies provided by Nature, which are sunlight, fresh air, and exercise. With regard to light and air, the byre should be as like as possible to the open field, and every animal should have frequent exercise.

WHAT ARE TANNIAS?

Tannias, or Taniers, belong to the genus *Xanthosoma*, but until recently they were confused with the taros, which belong to the genus *Colocasia*. The tannia is a tuber-bearing plant, of which both the tubers, the root stock, the young leaves, and the central stem are all edible. Few plants yield a higher proportion of food material for the weight of the entire plant than does the tannia—fully 75 per cent. of the weight of some types is food.

The roundish tuberous roots are borne just below the surface of the soil. Individual tubers weigh from a few ounces in some types to 1½ lb. to 2 lb. in the better sorts. Each plant produces from 2 to 4 lb., but, as 6,000 to 10,000 plants can be grown on 1 acre, the yield is from 6 to 20 tons of superior roots containing 20 to 30 per cent. of starch and little fibrous matter. To these figures may be added 5 to 10 tons of the rhizomes, which may be utilised for feeding swine or for making starch. Furthermore, by removing the first tubers as soon as ripe and allowing the plant to stand for six months longer, a second crop may be harvested. By this method, called "castration" in Trinidad, it is estimated that an acre of tannias can be made to yield 30 tons of tubers at one planting; few crops can produce this amount. Though preferring rich, moist loam, the tannia will thrive on almost any soil. Like its near relative, the taro, it revels in plenty of fresh water, but while the leaf development may be greater in wet situations the tuber percentage suffers. In some sorts the leaves are 3 feet wide by 4 feet long, and are of a pale green or deep mauve purple.

Boiled, fried, or baked, the better kinds of tannia are superior to the Irish potato; though most varieties are not so "mealy," they are richer, firmer, and possess more distinct flavour. Most sorts are pure white, but four are pinkish purple, and several are of various shades of yellow. The roots keep fairly well after harvesting.

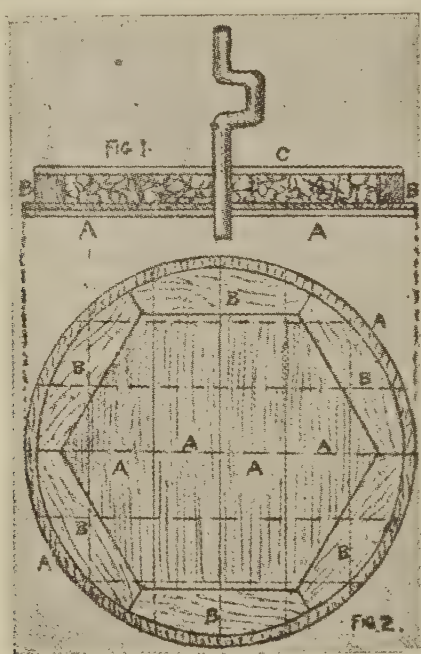
This plant is the oldest known of all tuberous food plants. It has been proved to have been cultivated by primitive man 2,000 years ago. It has during all those ages lost its power to ripen seeds. Other food plants have been carried to the far corners of the earth, but the tannia still remains unknown outside of tropical America. We have had many inquiries about the plant since we printed a short article on it in September last, which was taken from the "Mexican Investor." The above information is derived from the Bulletin of the Department of Agriculture, Kingston, Jamaica.

General Notes.

A WOODEN DRIVING WHEEL.

A wooden driving wheel is nothing uncommon, and we have seen some very strong and serviceable ones in different parts of the State. What the all-wood driving wheel lacks is weight. Now, here is an idea given in "Work" for a strong, weighty wheel, 3 feet in diameter, and weighing $1\frac{1}{2}$ cwt. :—

First place together on the bench a number of $\frac{1}{2}$-inch boards, of any width, edge to edge, and strike out a circle with a 19-inch radius. Cut out two circular pieces to the same radius, and nail them together to make a wheel 1 inch thick, with the grain crossing, as at A in the section, Fig. 1. Describe



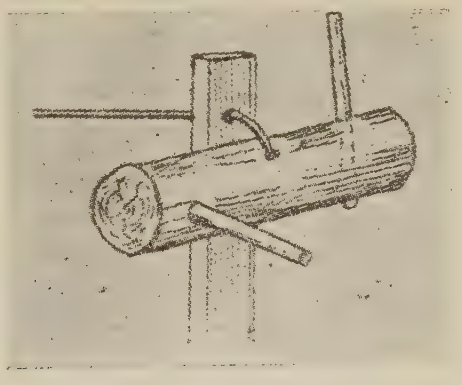
a circle with an 18-inch radius on one side; then, on a thin piece of board or cardboard strike an arc with the same radius, six of which will make the circle. Place a piece of $4\frac{1}{2}$-inch stuff on the arc, and mark down each side, and cut out the cardboard for the template. Then mark six patterns on a piece of $4\frac{1}{2}$-inch by 3-inch stuff, and cut out. Nail these pieces on the prepared inch-wheel to the line of the circle, as at B in the plan, Fig. 2, leaving a hexagonal-shaped space. Having bored the centre for the crank, pack the space with scrap iron, old lasts, weights, &c., taking care to see, by means of a straight-edge, that nothing is above the sides of the box. Now place the crank in position, at a perfect right angle with the wheel, or it will not turn true. Then mix up some cement in water, and pour in to fill up level with the sides, and, when set, nail a circle of $\frac{1}{2}$-inch wood, C (Fig. 1), over all. This results in a good heavy wheel at a far less cost than one of the same weight in a casting.

A SIMPLE WIRE-STRAINER.

Really all that is required is a nice round block of wood, not less than $2\frac{1}{2}$ inches diameter and 12 inches long. About 2 inches from either end bore, with a 1-inch centre-bit, a hole right through; only the two holes must be at right angles to each other—that is, while the hole at one end goes through from top to bottom, the hole at the other end goes through from side to side.

In the middle of the block is made a small hole about 1 inch deep, and just round enough to enable the end of a piece of wire to be inserted. The

only other requirements are two strong sticks, or, better still, short rods of iron, to put in the holes at either end of the roller, to act as levers in turning, and an iron wedge to keep the wire stiff after it has been strained, to enable



it to be fastened off. My wedge is an ordinary nail bit which got broken off half-way along, and answers the purpose admirably.

The operation is then easy enough. The wire is threaded through all the posts, and, after being pulled fairly straight, it is cut, leaving 12 inches or more to spare; the spare end is inserted in the small hole in the block, and the block is then gradually turned by means of the two levers until the wire is sufficiently taut. The widge is next hammered tightly into the hole the wire is in, and the roller can be released without any danger of the wire slackening. The spare wire should then be hammered round the post, and finished off with a key, which is simply a short stick or piece of iron with a small hole at one end, by which means the end of wire is firmly twisted round the main wire, three or four twists being quite enough. At this stage the wedge can be knocked out, and the job is done. Sometimes wedges of wood are used and left in the hole, but iron wedges are much more satisfactory.—" Farmer and Settler."

Answers to Correspondents.

THE OVER-RUN IN BUTTER-MAKING.

Novice, Childers.—

1. The over-run may be thus shortly explained. It is the additional butter made from 1 lb. of butter fat—that is, the extent to which the churn over-runs the test. The amount of over-run depends on many things, such as the thoroughness of the churning, the completeness of the skimming, and the way in which the butter is handled. To determine the amount of over-run, divide the total number of pounds of butter produced for a given time by the number of pounds of fat in the milk delivered to the creamery during that period.

SWEET POTATOES.

Gabriel Kirk, Hill View, Moonmera.—

1. The ends of the vines are usually preferred, but the supply is limited; suitable cuttings of other portions should be equally as good.

2. Yes. In some districts where it is desirable to plant out early, potatoes are forced into activity by placing in hot bed; when shoots are several inches in length, and hardy enough, they are planted out.

3. Depends on the length of cuttings and physical condition of soil whether it is advisable to make use of plough to cover, or to dibble in.

As a general rule, three-quarters of the length of cutting should be covered with soil.

Our correspondent should read the article on sweet potato growing by H. A. Tardent, in the first number of this Journal, July, 1897.

GIANT COUCH, OR *PANICUM MUTICUM*.

F. W. Rabjohns, Mooloolah.—

Mr. F. M. Bailey, in his Flora, describes the grass as follows:—

Panicum muticum (pointless).—Stems stout, elongating to 8 feet or more, the nodes more or less softly bearded. Leaves 6 to 12 inches long; the sheath glabrous or hairy; ligula short, ciliate. Panicle erect, 3 to 15 inches long. Spikes rather distant, stout, simple, or divided below; lower ones 2 to 4 inches long, upper gradually shorter.

Found in Java, Africa, and America. Was introduced by the late Dr. Joseph Bancroft, and is becoming naturalised; yields a large quantity of fodder when growing on damp or swampy land. We have omitted the purely scientific description of the grass. This grass has done well at the Agricultural College and the Biggenden State Farm, proving to be a strong-growing, coarse grass. In moist seasons it strikes roots from the nodes, and forms a dense mass of growth. Application for seed should be made direct to either place.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

Table Showing the Total Rainfall for each Month of the Year in the Agricultural Districts of Queensland.

Stations.	1905.				1906.								
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.
North.													
Bowen	4·03	0·05	3·91	0·04	12·84	8·73	6·29	0·78	6·34	0·69	0·04	0·36	3·41
Cairns	Nil	0·46	1·72	0·53	7·00	16·87	16·05	5·20	4·04	3·44	*2·28	1·79	1·57
Geraldton	Nil	0·22	5·44	1·14	15·61	37·67	19·67	11·51	7·93	16·05	5·73	6·65	4·26
Herberton	Nil	0·21	1·69	0·51	15·20	3·73	4·67	1·25	1·38	1·04	0·59	0·55	0·38
Hughenden	Nil	0·13	0·07	0·14	6·11	3·93	8·47	0·12	Nil	Nil	Nil	Nil	0·92
Kamerunga	Nil	0·63	1·05	0·33	7·25	13·76	14·93	4·94	4·13	3·55	2·49	2·03	2·56
Longreach	Nil	0·06	0·77	0·17	3·99	8·61	12·25	Nil	0·22	Nil	0·11	Nil	4·11
Lucinda	0·15	0·68	2·03	0·95	10·13	49·97	25·88	10·12	3·77	3·02	*0·40	†	Nil
Mackay	0·97	0·08	2·45	0·70	13·58	9·88	16 57	2·87	11·87	3·85	0·68	0·93	4·35
Rockhampton	0·70	0·91	1·05	4·77	4·24	15·31	8·26	Nil	5·27	1·12	Nil	2·61	3·80
Townsville	...	0·52	0·19	Nil	10·05	17·31	4·28	0·38	1·80	0·30	Nil	0·46	3·25
South.													
Barcaldine	Nil	0·15	1·49	1·30	4·00	7·07	13·84	Nil	1·70	0·19	0·10	Nil	2·88
Beenleigh	1·15	2·82	1·76	3·77	4·96	15·11	9·34	0·04	3·57	1·47	0·16	2·94	3·47
Biggenden	0·79	2·56	1·14	11·66	2·27	8·24	4·61	0·45	5·77	1·42	0·48	3·02	5·07
Blackall	Nil	0·29	1·45	0·83	5·13	11·14	11·99	Nil	1·75	0·22	0·48	0·02	4·70
Brisbane	1·32	2·22	3·63	8·21	4·16	12·71	4·85	0·45	3·23	1·38	0·22	4·21	3·48
Bundaberg	0·95	2·37	0·95	6·74	6·92	9·92	1·90	1·17	8·44	2·01	0·03	1·86	10·90
Caboolture	0·98	2·73	2·88	6·72	8·11	12·73	6·46	0·49	4·53	0·85	0·29	3·02	4·77
Charleville	0·09	0·99	0·68	0·12	1·29	10·66	3·15	0·07	...	0·13	2·34	0·35	4·99
Dalby	0·14	2·09	1·60	5·67	4·15	4·43	5·15	1·81	0·66	0·87	1·58	2·78	2·65
Emerald	0·29	0·64	4·41	0·80	6·12	7·81	5·22	0·08	2·12	0·17	Nil	1·62	4·47
Esk	0·65	3·21	3·65	5·98	5·49	6·79	9·04	1·74	3·25	0·77	0·38	4·51	4·14
Gatton College ...	0·54	2·59	3·59	4·73	3·75	5·33	9·43	1·40	1·90	0·60	0·41	3·73	3·54
Gayndah	0·30	2·38	1·93	5·58	2·81	9·65	5·86	0·51	5·10	0·48	0·22	2·34	5·14
Gindie	Nil	1·11	3·79	Nil	1·92	9·15	5·92	Nil	2·32	0·05	Nil	1·46	4·57
Goondiwindi	Nil	3·57	1·51	2·72	1·08	2·60	2·19	0·37	2·80	0·98	0·49	4·35	3·33
Gympie	1·85	1·48	1·44	5·03	6·07	7·38	5·58	0·45	6·88	2·26	0·52	3·19	3·97
Ipswich	0·70	2·91	3·32	3·64	5·30	7·22	3·87	0·12	1·67	0·25	0·17	2·59	2·94
Laidley	0·30	2·36	3·59	3·73	3·29	5·63	6·73	0·35	2·83	0·49	0·50	3·26	3·19
Maryborough	1·04	2·48	0·70	4·03	4·46	8·34	6·77	1·08	4·85	2·55	0·15	2·31	6·48
Nambour	1·62	4·70	0·85	5·37	7·01	16·50	9·35	1·13	6·20	3·68	0·61	4·52	8·94
Nerang	1·04	4·59	2·21	5·14	5·01	13·68	10·04	0·87	10·32	1·98	0·12	3·56	6·42
Roma	0·15	1·02	2·15	2·62	2·18	12·95	3·94	Nil	1·09	1·08	1·65	1·47	4·43
Stanthorpe	0·28	3·48	1·94	4·43	6·06	2·76	3·18	2·00	0·77	0·45	1·44	3·37	4·29
Tambo	Nil	0·85	1·57	0·39	5·09	9·05	10·63	Nil	0·66	0·05	0·67	0·07	5·17
Taroom	Nil	0·76	1·11	2·52	1·86	13·73	6·02	0·23	1·04	0·81	0·60	2·30	4·26
Tewantin	1·29	6·57	1·28	6·64	12·07	18·59	7·57	2·27	4·61	5·68	0·39	4·25	6·37
Texas	0·16	3·54	0·94	4·54	3·41	2·11	1·94	1·89	1·57	0·75	0·90	3·22	2·77
Toowoomba	0·61	2·59	2·09	3·20	6·17	6·58	8·87	2·07	2·65	0·85	1·81	3·63	4·64
Warwick	0·41	4·00	2·16	3·98	2·09	2·21	6·27	0·37	0·77	0·57	1·16	3·85	3·13
Westbrook	1·23	2·60	3·62	2·39	5·00	4·01	5·12	0·93	0·50	0·55	1·67	2·80	3·34

* From telegraphic reports—subject to alteration. † No reports received.

GEORGE G. BOND,
For the Hydraulic Engineer.

Times of Sunrise and Sunset, 1906.

Date.	September.		October.		November.		December.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·3	5·33	5·29	5·47	4·59	6·5	4·46	6·28
2	6·1	5·34	5·28	5·47	4·58	6·6	4·46	6·29
3	6·0	5·34	5·27	5·48	4·57	6·7	4·46	6·30
4	5·59	5·35	5·26	5·48	4·56	6·8	4·46	6·31
5	5·58	5·35	5·25	5·49	4·55	6·9	4·47	6·31
6	5·57	5·36	5·24	5·49	4·55	6·10	4·47	6·32
7	5·56	5·36	5·23	5·50	4·54	6·10	4·47	6·32
8	5·55	5·37	5·22	5·51	4·54	6·11	4·47	6·33
9	5·54	5·37	5·21	5·51	4·53	6·11	4·48	0·34
10	5·53	5·38	5·19	5·52	4·52	6·12	4·48	6·35
11	5·52	5·38	5·18	5·52	4·52	6·12	4·48	6·36
12	5·51	5·39	5·17	5·53	4·51	6·13	4·48	6·37
13	5·50	5·40	5·16	5·54	4·51	6·13	4·49	6·37
14	5·48	5·40	5·15	5·54	4·50	6·14	4·49	6·37
15	5·47	5·41	5·13	5·55	4·50	6·15	4·49	6·38
16	5·46	5·41	5·12	5·55	4·50	6·15	4·49	6·38
17	5·45	5·42	5·11	5·56	4·49	6·16	4·50	6·39
18	5·44	5·42	5·10	5·56	4·49	6·17	4·50	6·39
19	5·43	5·43	5·9	5·57	4·48	6·18	4·50	6·40
20	5·41	5·43	5·8	5·58	4·48	6·19	4·51	6·41
21	5·40	5·44	5·7	5·59	4·48	6·20	4·51	6·41
22	5·39	5·44	5·6	6·0	4·47	6·21	4·52	6·42
23	5·38	5·44	5·6	6·1	4·47	6·21	4·52	6·42
24	5·37	5·45	5·5	6·1	4·47	6·22	4·53	6·43
25	5·35	5·45	5·4	6·2	4·47	6·23	4·53	6·43
26	5·34	5·45	5·3	6·2	4·46	6·24	4·54	6·44
27	5·33	5·45	5·3	6·3	4·46	6·25	4·54	6·44
28	5·32	5·46	5·2	6·3	4·46	6·26	4·55	6·44
29	5·31	5·46	5·1	6·4	4·46	6·27	4·56	6·45
30	5·30	5·46	5·0	6·4	4·46	6·27	4·56	6·45
31	...	...	4·59	6·5	...	...	4·57	6·45

Phases of the Moon.

			H. M.
2 Sept.	○	Full Moon	9 36 p.m.
10 „	☽	Last Quarter	6 53 „
18 „	●	New Moon	10 33 a.m.
25 „	☾	First Quarter	4 11 „
2 Oct.	○	Full Moon	10 48 a.m.
10 „	☽	Last Quarter	1 39 p.m.
17 „	●	New Moon	8 42 „
24 „	☾	First Quarter	11 49 a.m.
1 Nov.	○	Full Moon	2 45 a.m.
9 „	☽	Last Quarter	7 44 „
16 „	●	New Moon	6 36 „
22 „	☾	First Quarter	10 39 p.m.
30 „	○	Full Moon	9 7 „
8 Dec.	☽	Last Quarter	11 45 p.m.
15 „	●	New Moon	4 54 „
22 „	☾	First Quarter	1 3 „
30 „	○	Full Moon	4 43 „

The approximate times for sunrise and sunset at Rockhampton, Townsville, and Cooktown may be obtained by *using the table for Brisbane, and adding* the following figures:—

1906.	Rockhampton.		Townsville.		Cooktown.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.
September 1 to 22	9 m.	11 m.	24 m.	30 m.	27 m.	35 m.
„ 23 to 30	10 m.	10 m.	28 m.	26 m.	32 m.	30 m.
October ...	12 m.	8 m.	32 m.	22 m.	38 m.	24 m.
November ...	16 m.	4 m.	40 m.	14 m.	50 m.	12 m.
December ...	18 m.	2 m.	44 m.	10 m.	55 m.	7 m.

The Markets.

PRICES FOR FRUIT—ROMA-STREET MARKETS.

Article.	AUGUST. Prices.
Apples, Eating, per packer, Hobart	8s. 6d. to 10s.
Apples, Eating, per packer, Hobart, best sorts	12s. to 14s.
Apples, American, per packer	...
Apples, Cooking, per packer	7s. 6d. to 9s. 6d.
Apples, Local, per packer	...
Apricots, quarter-case	...
Bananas, Local, per bunch	2s. to 3s.
Bananas, per case	6s. to 7s.
Bananas, Fiji, per bunch	2s. 6d. to 6s.
Bananas, Fiji, per case	11s. 6d. to 12s. 6d.
Cherries, quarter-case	...
Comquats, case	...
Lemons, per case, Local	4s. to 6s. 6d.
Lemons, per quarter-case, Imported	from 3s.
Mandarins	3s. 3d. to 5s. 6d.
Mangoes, half-case	...
Oranges, per packer, Imported	...
Oranges, Local, per packer	3s. to 4s. 6d.
Papaw Apples, per case	5s.
Passion Fruit, gin case	18s.
Peaches, quarter-case	...
Peanuts, per lb.	2½d.
Pears, Imported, per quarter-case	...
Pineapples (rough leaf), best sorts, per dozen	2s. to 3s.
Pineapples (smooth leaf), best sorts, per dozen	2s. to 4s. 6d.
Plums, Imported, quarter-case	...
Plums, Local, quarter-case	...
Quinces, Imported, per case	...
Rockmelons, per dozen	...
Strawberries, per tray	1s. to 2s. 6d.
Tomatoes, quarter-case	1s. 6d. to 3s. 9d.
Watermelons, per dozen	...
Cape Gooseberries, per quart	3½d. to 5d.
SOUTHERN FRUIT MARKET.	
Apples, per case	8s. to 14s.
Bananas, Queensland, per case	5s. to 6s.
,, ,, per bunch	1s. 6d. to 2s.
,, Fiji, per case	11s. to 12s. 6d.
,, ,, per bunch	2s. 6d. to 6s.
Chillies, per bushel	...
Lemons, per gin case	...
Mandarins, case	2s. 6d. to 18s.
Oranges, per case	2s. to 20s.
,, Queensland, per packer	...
Passion Fruit, per case	to 15s.
Pineapples, case	6s. to 12s.
,, per double case	...
Rockmelons, case	...
Tomatoes, Local, case	4s. to 4s. 6d.
,, Queensland, per quarter case	4s. to 5s. 6d.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR OCTOBER.

Article.		OCTOBER. Prices.
Bacon (Pineapple)	lb.	7d. to 8½d.
Bran	ton	£4 2s. 3d. to £4 5s.
Butter, Factory	lb.	1s.
Chaff, Mixed	ton	£3 15s. to £4
Chaff, Oaten	„	£4 5s. to £4 7s. 6d.
Chaff, Lucerne	„	£3 10s. to £5
Chaff, Wheaten	„	£2 15s.
Cheese	lb.	6½d. to 7d.
Hay, Oaten	ton	£5 to £5 5s.
Hay, Lucerne	„	£3 to £4
Honey	lb.	2d. to 2½d.
Maize	bush.	2s. 4¼d. to 2s. 6d.
Oats	„	...
Pollard	ton	£4 2s. 3d. to £4 5s.
Potatoes	„	£7 5s. to £10 5s.
Wheat, Milling	bush.	...
Wheat, Chick	„	3s. to 3s. 11d.
Onions	ton	£8 15s. to £12 15s.
Hams	lb.	10½d. to 11½d.
Eggs	doz.	5¼d. to 5¾d.
Fowls	pair	2s. 10d. to 3s. 10d.
Geese	„	5s. 3d. to 6s.
Ducks, English	„	3s. 7d. to 4s. 6d.
Ducks, Muscovy	„	...
Turkeys, Hens	„	6s. 7d. to 7s. 6d.
Turkeys, Gobblers	„	14s. 8d. to 16s. 7d.

ENOGGERA SALEYARDS.

Animal.	SEPTEMBER. Prices.
Bullocks	£8 5s. to £11 2s. 6d.
„ (Extra)	£13 10s. to £14 15s.
Cows	£7 to £9 5s.
Merino Wethers	30s. 6d.
„ Ewes	26s. 6d.
C.B. Wethers (Shorn)	23s. 6d.
„ Ewes	22s. 6d.
Lambs	16s. 6d.

Orchard Notes for December.

By ALBERT H. BENSON.

In the Orchard Notes for November, I called special attention to the importance of marketing fruit properly, emphasising the necessity for careful handling, even grading, and attractive packing if satisfactory prices are to be obtained. Those remarks apply equally to the present month, or, in fact, to any month of the year, as there is always more or less fruit of one variety or another to be marketed; and it is simply wasting time and money cultivating, pruning, manuring, or spraying an orchard—in fact, doing everything possible to produce good fruit—if when the fruit is grown it is not put to the market in such a manner that it will realise the highest price. Careful handling, grading, packing, and marketing will secure a ready sale for good fruit in any market, even when the same fruit badly handled and unattractively got up would be unsaleable. Growers would do well to take a lesson in packing from the Californians who have been shipping apples, or from the Italians who are shipping lemons, to this State, as those fruits, even after a long and trying voyage and one or more transhipments, reach here in better condition and in a much more attractive state than our local fruit, which is often only carted a few miles.

Keep down pests wherever met with; gather and destroy all fly-infested fruit. Destroy orange bugs before they become mature by hand-picking or by driving them to the trunks of the trees, by tapping the other branches with light poles, the insects being brushed off from the trunks and main branches on to a sheet placed under the tree to catch them, from which they can be easily gathered and burnt.

All caterpillars, cut-worms, beetles, grasshoppers, crickets, or other insects destroying the foliage should be destroyed by either spraying the same with Paris green, 1 oz. to 10 gallons of water, or by dusting them with a mixture of Paris green and air-slacked lime, 1 oz. of Paris green to 5 lb. of lime. Keep the orchard well cultivated, especially in the dry districts; and where there is water available for irrigation in such districts, all citrus trees should receive a watering during the month unless there is a good fall of rain, when it will be, of course, unnecessary.

Pineapples, bananas, and other tropical fruit can be planted during the month, showery weather and dull days being chosen. The rainy season is the best time to transplant most tropical plants. Where it is desirable to go in for green-crop manuring, or for raising the green crop for mulching, cowpeas can be sown, as they will be found to make a very rapid growth now, which will be strong enough to keep most weeds in check.

See that all surface and cut-off drains are in good working order, and not choked up with grass, weeds, &c., as heavy rain may fall during the month, and there should be a get-away for all surplus water, which would tend to either wash the soil or sour it; stagnant water round the roots of the trees being exceedingly injurious at any time, and especially so during the heat of summer.

Farm and Garden Notes for December.

Field.—The grain harvest will now be nearing fruition, and it is to be hoped that the magnificent yield that has been predicted will be fully realised. Heavy rains were experienced last month in most parts of the grain-producing districts, but the effect will scarcely be to diminish the expected return. The estimates of the crop have been almost unanimous, and have run from 1,800,000 bushels up to 2,000,000 bushels, and if the estimated yield of from 17 to 19 bushels per acre be realised Queensland will have no cause to regret the efforts that were taken to renew the cultivation of grain-producing crops after the effects of the drought of four years ago.

Given favourable weather, maize, panicum, imphee, Kafir corn, and sorghum may be sown, and arrowroot, ginger, and sweet potatoes planted.

Kitchen Garden.—Gather cucumbers, melons, vegetable marrows, and French beans as soon as they are fit for use. Even if they are not required, still they should be gathered, otherwise the plants will leave off bearing. Seeds of all these may still be sown for a succession. Tomatoes should be in full bearing, and the plants should be securely trained on trellises or stakes. Take up onions, and spread them out thinly on the barn floor until the tops wither sufficiently to pull off easily. They should then be graded into sizes, and sent to market or stored in a cool dry place. Where there is an unlimited supply of water and shade can be provided, lettuce and other salad plants may still be sown.

Flower Garden.—Keep the surface of the land well stirred. Do not always stir to the same depth, otherwise you are liable to form a "hard pan," or caked surface, beneath the loose soil. Alternate light with deep hoeings. A few annuals may still be planted, such as balsams, calendulas, cosmos, coreopsis, marigold, nasturtium, portulacca, zinnia, and cockscomb. Plant out whatever amaranthus may be ready. They may still be sown in boxes. Clear away all annuals which have done flowering. Bulbs should have all the dead leaves cut away, but the green leaves should not be touched. Stake chrysanthemums, and, as the flower buds develop, give them weak liquid manure. Coleus may now be planted and propagated from cuttings. Dahlias are in various stages, but the greater part will have been planted by this time. Give them liquid manure, and never let them dry up. Lift narcissus about the end of the year, but do not store them. Plant out at once in their new positions. Top dress all lawns.

LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Allora ...	Central Downs Agricultural and Horticultural Association	J. H. Buxton ...		
Allora ...	The Allora Farmers' Progress Association	P. Donovan ...		
Amby ...	Amby Farmers' Association	W. Jas. Sullivan ...		
Atherton ...	Barron Valley Agricultural, Pastoral, and Industrial Association	G. Bardon	5 and 6 July	4 and 5 July
Atherton ...	The Atherton District Farmers' Association	Fredk. Stewart ...		
Avondale ...	Avondale Farmers and Planters' Association	Edward J. Gayland		
Ayr	Lower Burdekin Farmers' Association	G. S. Mackersie ...		
Ayr	Lower Burdekin Pastoral, Agricultural, and Industrial Association	Philip Grout ...		
Ballandean ...	Lyra Farmers' Progress Association	M. B. Marlay ...		
Barker's Creek	North Barker's Creek Farmers' Progress Association	A. Becker		
Beaudesert ...	Logan and Albert Pastoral and Agricultural Society	A. Winship ...	20 June	8 May
Beenleigh ...	Agricultural and Pastoral Society of Southern Queensland	Wilson Holliday ...	15 Sept.	28 Sept.
Beenleigh ...	Logan Farming and Industrial Association	Wm. G. Winnett, Loganlea		
Biggenden ...	Biggenden Agricultural and Pastoral Society	C. J. Stephensen ...	6 and 7 July	5 and 6 July
Birthamba ...	New Hope Farmers' Association ...	G. W. Nixon ...		
Blackbutt ...	Farmers' Progress Association ...	John Dreghorn ...		
Boonah ...	Fassifern and Dugandan Agricultural and Pastoral Association	C. E. Mackenzie ...	17 and 18 May	6 and 7 June
Booyal ...	Booyal Farmers' Progress Association	Thos. Skillington ..		
Bowen ...	Pastoral, Agricultural, and Mining Association	Geo. Turner ...	11 Aug	17 Aug.
Bowen ...	Proserpine Farmers and Settlers' Association	R. Toogood ...		
Bowen (Proserpine)	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Bowen ...	Bowen Farmers and Fruitgrowers' Association	H. C. Smethurst ...		
Bowenville (Gordon Vale)	Moola Farmers' Progress Association	Alex. Gordon ...		
Brisbane ...	Horticultural Society of Queensland	F. W. Woodruffe ...	...	24 and 25 April
Brisbane ...	Queensland Acclimatisation Society	E. Grimley ...		
Brisbane ...	National Agricultural and Industrial Association of Queensland	Charles A. Arvier	8, 9, 10, and 11 Aug.	7, 8, 9, 10, and 11 Aug.
Brisbane ...	United Pastoralists' Association ...	Fredk. Ranson ...		
Brisbane ...	Queensland Chamber of Agriculture	F. W. Peek ...		
Brisbane ...	Queensland Citrus-growers' Asssociation	R. M. Cooper ...		
Brisbane ...	Combined Moreton Association ...	Wm. Ewart ..		
Brookfield ...	The Brookfield and Pullen Vale Farmers, Dairymen, and Fruitgrowers' Association	W. R. Moon ...		
Brooyar ...	Brooyar Farmers' Progress Association	E. Pike		
Buderim ...	Buderim Mountain Coffee and Fruitgrowers' Association	G. O. Burnett ...		
Buderim Mt.	North Coast Central Associatfon ...	James Lindsay ...		
Bundaberg ...	Bundaberg Horticultural and Industrial Society	H. E. Ashley ...		
Bundaberg ...	Council of Agriculture	H. J. Page ...		
Bundaberg ...	Woongarra Canegrowers and Farmers' Association	F. Watson ...		
Bundaberg ...	Bundaberg Agricultural, Pastoral, and Industrial Society	H. J. Page ...	14 and 15 June	26 and 27 Sept.
Burpengary...	Burpengary Farmers' Association ...	F. W. Uhlmann ...		
Byrnestown...	Byrnestown Farmers' Progress Association	Chr. H. Fredriksen		
Caboolture ...	Upper Caboolture Farmers' Association	Jos. Wilson ...		
Cairns ...	Aloombah Farmers' Association ...	N. P. Petersen ...		
Cairns ...	Cairns Agricultural, Pastoral, and Mining Association	J. Reid	7 and 8 Sept.	30 and 31 Aug.

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Cairns ...	Cairns District Coffee-growers' Association	L. Battinson ...		
Cairns ...	Cairns District United Farmers' Association	Wm. Griffin ...		
Cardwell ...	Rockingham Progress Association ...	T. E. Fitzsimmons		
Charleville ...	Central Warrego Pastoral and Agricultural Association	G. M. Bell... ...		
Charters Towers	Towers Pastoral, Agricultural, and Mining Association	A. H. Pritchard ...	31 May, and 1, 2, 3 June	31 May, and 1, 2 June
Childers ...	Isis Agricultural Association	H. Epps		
Childers ...	Doolbi Mill Branch, Isis Agricultural Association	W. T. H. Job ...		
Childers ...	Childers Mill Branch, Isis Agricultural Association	H. Epps		
Childers ...	Childers Pastoral, Agricultural, and Industrial Society	A. Eastaughffe ...	1 and 2 June	14 and 15 June
Childers ...	The Childers Mill Canegrowers' Association	A. Eastaughffe ...		
Clermont ...	Peak Downs Pastoral, Horticultural, and Agricultural Society	F. Leysley		
Clermont ...	Peak Downs Dairymen and Settlers' Association	A. G. Pursell ...		
Cleveland ...	Cleveland Horticultural Society ...	Miles R. Fox ...	14 Oct.	13 Oct.
Clifton ...	Darling Downs Pastoral, Agricultural, and Industrial Association	S. J. B. Just ...	13 Sept.	12 Sept.
Coochin ...	The Coochin Farmers' Progress Association	J. T. W. McLaughlin		
Cooyar ...	Yeraman Creek Farmers' Progress Association	George Seely ...		
Cooran ...	Cooran Progress and Agricultural Association	A. G. Bosanquet ...		
Cordalba ...	Cordalba Farmers' Association ...	J. Jeffrey		
Coulson ...	Coulson Farmers' Progress Association	G. R. Johnson ...		
Crow's Nest	The Crow's Nest Agricultural and Horticultural Society	James Gleeson ...	26 July	24 and 25 July
Croydon ...	The Gulf Mining, Pastoral, and Industrial Association	V. Creagh		
Cunnamulla	South Warrego Pastoral Association	J. Winward ...		
Dalby ...	Northern Downs Pastoral and Agricultural Association	E. Watt	26 and 27 July	25 and 26 July
Dallarnil Scrub, *viâ* Degilbo	Dallarnil Farmers' Association ...	Vincent H. Jones		
Danderoo ...	Danderoo Farmers' Progress Association	T. Campbe ...		
Deception Bay	Deception Bay Farmers' Association	B. J. T. Liscombe		
Degilbo ...	Degilbo District Farmers' Association	J. P. Laugher ...		
Dundowran, *viâ* Maryborough	Dundowran and Takura Settlers' Association	H. J. E. Tooth ...		
Esk	Esk Agricultural, Pastoral, and Industrial Society	Thos. C. Pryde ...	24 and 25 May	29 and 30 May
Eudlo ...	Eudlo Farmers and Fruitgrowers' Progress Association	Walter T. Jeremy		
Flagstone Ck., *viâ* Helidon	Flagstone Creek Farmers' Progress Association	James Scanlan ...		
Forest Hill ...	Forest Hill Agricultural and Progress Association	Wm. Jones ...		
Gayndah ...	Gayndah Pastoral, Industrial, Agricultural, and Horticultural Association	Thomas McMahon		
Geraldton ...	Johnstone River Sugar-growers and Manufacturers' Association	Ralph Reid ...		
Gin Gin ...	Currajong and Gin Gin Agricultural and Pastoral Society	J. R. Hamilton ...	24 May	28 May
Gladstone ...	Gladstone Pastoral and Agricultural Association	W. J. Manning ...		
Gladstone ...	Port Curtis Agricultural, Pastoral, and Mining Association	J. T. W. Brown ...		
Gooburrum, Bundaberg	Gooburrum Farmers and Canegrowers' Association	W. J. Tutin ...		
Goombungee	Goombungee Farmers' Association ...	Thos. Smith ...		
Goondiwindi	MacIntyre River Pastoral and Agricultural Society	E. T. Drake ...	...	1 and 2 May
Goondoon, *viâ* Bundaberg	Goondoon Farmers' Association ...	J. F. Cory		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Gracemere ...	The Gracemere District Farmers and Progress Association	Arthur E. Fisher...		
Gympie ...	Agricultural, Mining, and Pastoral Society	F. Vaughan ...	13 and 14 Sept.	15 and 16 Aug.
Gympie ...	Chatsworth Farmers' Progress Association	W. Allen		
Gympie ...	Deep Creek Farmers' Progress Association	H. Bath		
Gympie ...	Gympie Horticultural Society ...	Charles Brasch ...		
Gympie ...	Imbil Road Farmers and Settlers' Progress Association	D. J. O'Farrell ...		
Gympie ...	Woondum and Brisbane Road Farmers' Progress Association	Chas. E. Gambling		
Hambledon (Cairns)	Hambledon Planters' Association ...	W. L. Hawkins ..		
Harrisville ...	Harrisville Farmers' Progress Association	W. J. Burnett ...		
Haslemore, Victoria, Herbert Riv.	Herbert River Farmers' League ...	Alfred Henry ...		
Hatton Vale	Hatton Vale Farmers' Progress Association	P. Sharry, junr. ...		
Headington Hill	Headington Hill Farmers' Progress Association	J. E. Stehn ...		
Helidon ...	Helidon Scrub Farmers' Progress Association	James Sweeney ...		
Helidon ...	Monkey Creek Farmers' Progress Association, Withcott, Helidon	Thomas Turner ...		
Hendra ...	Nundah Agricultural, Horticultural, and Industrial Association	Geo. A. Patullo ...	28 Oct.	13 Oct.
Herbert River	Halifax Planters' Club	A. Campbell ...		
Herbert River	Macknade Farmers' Association ...	Edwin S. Waller ...		
Herbert River	Ripple Creek Farmers' Association ...	J. W. Grimes ...		
Herbert River	Fairford Farmers' Association ...	D. G. Scott ...		
Herbert River	United Farmers' Association ...	D. G. Scott ...		
Herberton ...	Mining, Pastoral, and Agricultural Association	John M. Hollway	...	22 and 23 May
Hodgson ...	Hodgson Farmers' Association ...	Fred. Warner ...		
Home Creek, *via* Wondai	Home Creek Farmers' Progress Association	A. Iker		
Hopetoun ...	Hopetoun Pastoral, Agricultural, and Progressive Association	John Walsh ...		
Hughenden ...	Hughenden Pastoral and Agricultural Association	H. G. McLean ...	19 and 20 June	
Ingham ...	Fairfield Farmers' Association ..	B. Lynn		
Ingham ...	Gairloch Farmers' Association ...	B. Lynn		
Ingham ...	Herbert River Pastoral and Agricultural Association (Agricultural Show)	P. J. Cochrane ...	8 and 9 Sept.	
Ingham ...	Stone River Farmers' Association ...	F. A. Rankin ...		
Ingham ...	Victoria Farmers' Association ...	W. C. S. Warren...		
Ipswich ...	Ipswich and West Moreton Agricultural and Horticultural Society	P. W. Cameron ...	...	11 Oct.
Ipswich ...	Queensland Pastoral and Agricultural Society	J. McGill	14 and 15 June	20 and 21 June
Kelsey Creek *viâ* Bowen	Kelsey Creek Farmers' Progress Association	A. Fontaine ...		
Kolan, North	Kolan Canegrowers and Farmers' Association	Jas. H. Hendy ...		
Kilkivan ...	Kilkivan District Farmers and Settlers' Progress Association	J. H. McKewen ...		
Killarney ...	Killarney Farmers' Association ...	J. H Hansen ...		
Kingaroy ...	South Burnett Agricultural, Pastoral, and Industrial Society	T. J. Lacey ...	...	3 and 4 July
Laidley ...	Lockyer Agricultural and Industrial Society (at Gatton)	W. A. McIlwraith	13 July	4 and 5 July
Lakeside ...	Mungore Farmers' Association ...	C. C. Ridley ...		
Lillydale, Helidon	The Flagstone Creek Farmers' Progress Association	Danl. Ryan ...		
Longreach ...	Longreach Pastoral and Agricultural Society	J. P. Peterson ...	8 and 9 May	1 and 2 May
Lucinda Point	Victoria Farmers' Association ...	W. S. C. Warren...		
Ma Ma Creek, *viâ* Grantham	Ma Ma Creek Farmers' Progress Association	A. McKenzie ...		
Mackay ...	Agricultural, Pastoral, and Mining Association	F. Black		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Mackay ...	Pioneer River Farmers' and Graziers' Association	J. P. Moule ...	7 and 8 June	20 and 21 June
Mackay ...	The Mackay and District Horticultural Society	Fred. Bourne ...		
Mapleton ...	Fruitgrowers and Farmers' Progressive Association	W. J. Smith ...		
Mareeba ...	Mareeba Mining, Pastoral, and Agricultural Association	F. Cruckshank ...		
Maroochy ...	Bli Bli Farmers' Progressive and Industrial Association	H. A. Keil... ...		
Maryborough	Maryborough Horticultural Society...	H. A. Jones ...		
Maryborough	The Island Farmers' Progress Association	H. Simpson, junr.		
Maryborough	Wide Bay and Burnett Pastoral and Agricultural Society	A. H. Jones ...	19, 20, and 21 July	23, 24, and 25 May
Miriam Vale	Miriam Vale Farmers' Association	J. Spencer		
Montville ...	Montville Fruitgrowers and Farmers' Progress Association	C. J. Wyer ...		
Mooloolah ...	Mooloolah Farmers' and Fruitgrowers' Progress Association	G. S. Skerman ...		
Mooloolah ...	The United Progress Association, Caboolture, No. 1 Division	C. Court ...		
Mosman River	Mosman River Farmers' Association	Geo. W. Muntz ...		
Mosman ...	Mosman District Agricultural Society	G. W. Muntz ...		
Mount Cotton	Mount Cotton and Redland Bay Fruitgrowers and Farmers' Association	W. E. Burns ...		
Mount Mee...	Mount Mee Farmers' Association ...	Jas. H. Robinson ...		
Mount Morgan	Mount Morgan Agricultural, Pastoral, and Poultry Society	J. S. Lyle ...		
Mount Ubi, Eumundi	The Kenilworth Farmers' Association	Alex. Purdon ...		
Nambour ...	The Rosemount Association	George Etheridge		
Nambour ...	Dulong and Kureelpa Farmers' and Canegrowers' Association	A. A. Petrie ...		
Nambour ...	The Obi Obi Farmers and Dairymen's Progressive Association	A. D. Crichton ...		
Nanango ...	Nanango Agricultural, Pastoral, and Mineral Society	J. W. Sigley ...	12 and 13 April	9 and 10 May
Nanango ...	Coolabunia Farmers' Association ...	Ezra Horne ...		
Nanango ...	Malar Farmers' Association	A. Becker		
Nerang ...	Southern Queensland and Border Agricultural and Pastoral Association	H. J. Cooper ...	13 Oct.	14 Sept.
North Isis ...	North Isis Canegrowers' Association	T. E. Barnes ...		
North Pine ...	Moreton Agricultural, Horticultural, and Industrial Association	N. McKenzie ...		
Oakey ...	Oakey Agricultural and Pastoral Society	E. R. Pace		
Palmwoods ...	Palmwoods Industrial Fruitgrowers' Progress Association	H. Taylor		
Peachester, *viâ* Beerwah, N.C. Line	The Peachester Progress Association	R. G. Denny ...		
Pittsworth ...	Pittsworth Pastoral, Agricultural, and Horticultural Association	C. Longland ...	7 and 8 Feb.	31 Jan.
Pomona ...	Pomona Agricultural and Progress Association	H. Armitage, senr.		
Port Douglas	Port Douglas and Mosman Pastoral, Agricultural, Horticultural, and Mining Association	H. McMahon ...		
Port Douglas	Daintree Farmers' Association ...	J. Carlos Allen Donally		
Proserpine ...	Preston Farmers' and Settlers' Association	R. C. Dagg ...		
Proserpine ...	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Roadvale ...	Roadvale Progress Association ...	Henry Clark ..		
Rockhampton	Alton Downs Farmers' Association...	Thos. Thomasson...		
Rockhampton	Central Queensland Farmers and Selectors' Association	T. Whitely, Coowonga		
Rockhampton	Central Queensland Stockowners' Association	R. R. Dawbarn ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Rockhampton	Rockhampton Agricultural Society...	A. S. Tompson ...	16 and 17 June	20, 21, and 22 June, 1907
Roma ...	Western Pastoral and Agricultural Association of Queensland	Angus McPherson	18 and 19 July	17 and 18 July
Roma ...	Yingerbay Farmers' Association ...	R. Frederick ...		
Roma (Blythedale)	Warooby Farmers' Association ...	Geo. Munt... ...		
Rosewood ...	Farmers' Club	P. H. Adams ...	6 and 7 Sept.	5 and 6 Sept.
Sandgate ...	Queensland Beekeepers' Association	A. H. W. Clarkson		
South Kolan	South Kolan Farmers and Planters' Association	John Whalley ...		
Southport ...	Southport Horticultural Society ...	E. Fass		
Spring Bluff	Aubigny Farmers' Progress Association	J. R. Torbock ...		
Springsure ...	Queensland Pastoral Society... ...	G. R. Milliken ...		
Stanthorpe ...	Border Pastoral, Agricultural, and Mining Society	Geo. Simcocks ...	9 and 10 Feb.	22, 23, and 24 Feb.
Stanwell ...	The Stanwell Agricultural Society ...	A. Spanner ...		
Stanwell ...	Stanwell District Farmers' Agricultural and Progress Association	W. Crowe		
St. George ...	Balonne Pastoral and Agricultural Association	T. M. Cummings ...		
Taabinga ...	The Taabinga Farmers' Progress Association	T. Pass		
Tannymorel, *viâ* Warwick	The Tannymorel Farmers' Progressive Association	Maurice Clifford ...		
Teutoberg ...	Teutoberg Farmers' Progress Association	E. M. Nothling ...		
Tiaro	Tiaro District Farmers' Progress Association	L. H. Riddles ...		
Tinana ...	Tinana Fruitgrowers and Farmers' Association	H. G. Habler ...		
Tingoora ...	Tingoora Farmers' Progress Association	Arthur Boisen ...		
Toowoomba...	Queensland Vine and Fruit Growers' Association	Hy. A. Tardent ...		
Toowoomba...	Royal Agricultural Society of Queensland	G. A. Leichney ...	1, 2, 3, and 4 Aug.	1, 2, and 3 Aug.
Townsville ...	Townsville Pastoral, Agricultural, and Industrial Association (formerly North Queensland Pastoral and Agricultural Association)	J. N. Parkes ...	6, 7, and 8 June	6 and 7 June
Upper Kedron	Upper Kedron Fruitgrowers and Farmers' Association	A. Marshall ...		
Upper North Pine	Upper North Pine Farmers' Association	J. Skerman ...		
Wallumbilla	Wallumbilla Farmers' Association ...	Edmund H. Yates		
Warren Siding	The Stanwell United District Farmers' Union	G. N. Terry ...		
Warwick ...	Eastern Downs Horticultural and Agricultural Association	F. H. Selke ...	15 and 16 Feb.	13, 14, and 15 Feb.
Wellington Point	Wellington Point Agricultural, Horticultural, and Industrial Association	Victor Drury ...	15 July	14 July
West Haldon, *viâ* Greenmount	West Haldon Farmers' Progress Association	A. E. Ayris ...		
Wondai ..	Mondure Farmers' Progress Association	W. E. Horne ...		
Woodend ...	Warren-Woodend Farmers' Club ...	W. Lehfeldt ...		
Woodford ...	Woodford Progressive Industrial Association	E. Heaton		
Woombye ...	Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society	P. S. Hungerford...	12 and 13 July	11 and 12 July
Woombye ...	Woombye Fruitgrowers' and Progress Association	E. E. McNall ...		
Wooroolin, *viâ* Nanango	Wooroolin Farmers' Progress Association	A. Deighton ...		
Yandina ...	Yandina-Maroochy Progress Association	Chas. Ablin ...		
Zillmere ...	Zillmere Horticultural Society ...	E. H. Decker ...		29 Sept.

Public Announcements.

The EDITOR will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the EDITOR, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, covers in boards and cloth will be supplied from this office on application to the Under Secretary for Agriculture and Stock. Applications must be accompanied by a remittance of SIXPENCE to cover cost. For the convenience of those who are not within reach of a bookbinder, a Special Cover has been designed, which obviates the necessity for binding. These covers will be supplied at ONE SHILLING each.

In order to avoid disappointment, correspondents who wish for replies to questions in the *Journal* are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

For the information of those who are desirous of communicating with the managers of State farms, we give their names and addresses below:—Queensland Agricultural College, Gatton, principal, J. Mahon; Westbrook State Farm, Westbrook, manager, C. Ross; Biggenden State Farm, Biggenden, manager, D. Macpherson; Hermitage State Farm, Warwick, manager, Alexander Martin; Gindie State Farm, manager, R. Jarrott; Kamerunga State Nursery, Cairns, manager, Howard Newport; Roma State Farm, manager, R. Soutter; Botanic Gardens, director, J. F. Bailey.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

PURCHASE OF STOCK AND PRODUCE FROM THE DEPARTMENT OF AGRICULTURE.

Purchasers of Stock and Produce, Plants, Seed, &c., from the State Farms and Agricultural College are reminded that Sales from these Institutions are made for Cash only. Persons desirous of making purchases should, therefore, first ascertain the cost of whatever articles they desire to obtain, and remit the full purchase-money when sendiug an order.

HERMITAGE STATE FARM.

FOR SALE.

PURE-BRED MIDDLE YORKSHIRE BOARS (Progeny of Imported Stock), £2 2s. each on rail at Hermitage.

TURKEY GOBBLERS, 11 months old, TEN SHILLINGS each on rail at Hermitage.

FOR SERVICE—

Middle Yorkshire Boar, HOLYWELL CHUB (Imported)
Berkshire Boar, YOUNG BOOMERANG (Imported).

Full particulars on application to THE MANAGER, State Farm, Hermitage.

QUEENSLAND AGRICULTURAL COLLEGE.

The College, which is situated within 4 miles of Gatton and 1 mile from the College Railway Siding, comprises 1,692 acres, and the buildings can accommodate 60 Students.

TERMS.

Twenty-seven Pounds per annum, paid half-yearly in advance. Students are also charged One Pound per annum each for medical attendance, the sports fund, and for guarantee fee.

The course of instruction includes PRACTICAL AGRICULTURE in all its branches, DAIRYING, GARDENING, STOCK-BREEDING, and MECHANICAL ARTS. Classes are also held daily for THEORETICAL INSTRUCTION in these branches, as well as in SURVEYING, CHEMISTRY, &c.

The College Calendar, giving full particulars, may be obtained on application to the Principal at the College, or to the Under Secretary for Agriculture and Stock, Brisbane.

BURSARIES.

Four bursaries are given annually. An examination for these is held in June or July of each year. Bursaries will be awarded upon the following conditions:—Candidates (males) to be from fifteen to seventeen years of age, of sound constitution, and in good health; they must have resided in the State for the two years immediately preceding the time of their examination for such bursary, or their parents must have resided in the State three years immediately preceding such examination. The bursar is entitled—subject to good behaviour and the pleasure of Parliament—to free board and instruction as a resident student for a period of three years. He is required to take up his residence at the College within one month of the publication of the results of the examination; otherwise he forfeits his right to a bursary.

From and after 1st January, 1907, the AGE of CANDIDATES for Admission to the College as Students will be Sixteen Years instead of fifteen.

STATE FARM, WESTBROOK.

MAIZE AND PUMPKIN SEED.

STAR LEEMING MAIZE.

A Limited Quantity of Seed is now ready for distribution.

Price: Six Shillings per bushel, f.o.b., Westbrook.

The strain has been improved by careful selection, and the Seed is from the Centre of the Cobs only.

SILVER NUGGET PUMPKIN.

The Seed of this, the best of all Table Pumpkins, is also an excellent strain.

Price: Six Shillings per lb.

Both the above have been saved from isolated crops, no other varieties of maize or pumpkins being grown near them.

To expedite delivery, application should be made direct to the MANAGER, Westbrook State Farm, together with remittance to cover Cost of Seed and Freight.

POULTRY.

GOLDEN WYANDOTTE COCKERELS, from Heavy Laying Strains, FOR SALE. Price: Seven Shillings and Sixpence each. Apply to

The MANAGER.

NOMINATED IMMIGRATION.

RESIDENTS OF QUEENSLAND

Desirous of Assisting their Friends or Relatives in the United Kingdom or other parts of Europe to EMIGRATE to Queensland, may procure full Information from any Clerk of Petty Sessions, or from the Immigration Agent, Brisbane.

The following shows THE SCALE OF PAYMENTS for Nominated Passages:—

Sex.	Between One and Twelve Years.	Between Twelve and Forty Years.	Above Forty and under Fifty-five.	Fifty-five and Upwards
	£	£	£	
Male	2	5	10	The full amount of Passage Money, £15 15s
Female	1	3	10	
Infants	Free			

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PART 6

AUDAX AT FIDELIS

QUEENSLAND

December, 1906.

The Queensland Agricultural Journal

For terms of Subscription
SEE PUBLIC ANNOUNCEMENTS.

F.C.Y.

Edited by
A. J. BOYD, F.R.G.S.Q.

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THE

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ISSUED BY DIRECTION OF

The Hon. THE SECRETARY FOR AGRICULTURE.

Edited by A. J. BOYD F.R.G.S.Q.

VOL. XVII. PART 6.

DECEMBER.

By Authority:

BRISBANE: GEORGE ARTHUR VAUGHAN, GOVERNMENT PRINTER.

1906.

CONTENTS.

NOTICE.

Queensland Agricultural Journal.

It is hereby notified that the *Journal* will be supplied to all members of Agricultural and Horticultural Societies who do not derive their livelihood solely from the land, on payment, in advance, of an annual subscription of 5s., which will include postage. Schools of Arts will be supplied at the same rate.

Persons resident in Queensland whose main source of income is from Agricultural, Pastoral, or Horticultural pursuits, which fact should be stated on the attached Order Form, will receive the *Journal* free

ON PRE-PAYMENT OF 1s. PER ANNUM,

to cover postage.

To all other persons the annual subscription will be 10s., which will include postage.

All remittances should be made by postal notes or money orders, but where they are unobtainable stamps will be accepted, though the Department accepts no responsibility for any loss due to the latter mode of remitting.

For your convenience an Order Form is attached. A cross on each side of the Order Form indicates to the recipient that his subscription is again due.

Amount of one year's subscription should therefore be forwarded with Order Form, without delay, to the UNDER SECRETARY, Department of Agriculture and Stock, Brisbane.

All subscriptions received for the *Journal* after the seventh day of the month will commence with the month after that on which payment is received. Previous copies available will be supplied at 6d. per copy.

ORDER FORM.

To the Under Secretary, Department of Agriculture and Stock, Brisbane.

For the enclosed..please forward me THE QUEENSLAND AGRICULTURAL JOURNAL for One Year.*

Name..

PLEASE WRITE PLAINLY.

Address..

....

Occupation..

* State amount according to above rates.

Agriculture.

GINSENG.

Three or four years ago we gave several instructive particulars on the cultivation of the drug ginseng, and on the fabulous prices paid for the root in China, where it is used as a medicine. In the issue of this Journal for June, 1902, p. 438, will be found an authentic account of the immense profits made by two gentlemen who started a ginseng garden at Tulu, New York State, in 1897. Their first planting resulted, owing to ignorance of the conditions under which the plant should be grown, in a dead loss of 3,000 roots. They planted again in 1898, and raised 80,000 roots, of which they sold 40,000. By the year 1901 they had enlarged their garden to half an acre, and during that year the profits reached £1,000, to produce which the outlay for the year was under £12. There are, strange to say, only a few acres of ginseng cultivated in America, and these only in localities where wild ginseng is indigenous.

The most esteemed variety of the plant is that grown in Korea. All the ginseng collected in China is imperial property, and is sold to those who have the privilege of dealing in it at its weight in gold. Of two kinds, the white and the red, the former is most valued, and is accordingly becoming more valuable as its production decreases. The root generally occurs in hard, rather brittle, translucent pieces, about the size of the little finger, and varying in length from 2 to 4 inches In price, it ranges from 24s. to 48s. up to even £60 per ounce! In preparing a ginseng garden, or Sam-po as it is called in Korea, extensive preparations are made. In early winter thousands of loads of a variety of disintegrated granite are heaped up in separate mounds. Then this is covered with a rich mulch made from the leaves of the chestnut oak, known to Koreans as the "Sang." The leaves are gathered in the spring and summer, pulverised, and sprinkled with water to help decomposition. This mulch is the only fertiliser used. No other fertiliser has been found which is equally efficient.

As soon as the frost is out of the ground the garden is ploughed up and thoroughly worked over with a spade operated by a gang of four or five men. We have seen this five-man spade worked at Mackay in the preparation of the ground for sweet potatoes. The Korean spade is of wood, has an iron shoe or tip, and a handle 8 to 10 feet long, to the butt of which are fastened two straw ropes. The captain, as he may be called, manipulates the handle, while each half of the crew gives its attention to a rope. Then, "with a long pull, a strong pull, and a pull all together," an amazingly small quantity of dirt is thrown a distance of 2 feet or so. After the beds have been made high enough to prevent the possibility of water getting to the roots of the plants, they are dug out to the depth of about 6 inches and carefully edged with slabs of slate. Then the dug-out is filled with the artificial leaf soil.

Sam is propagated from seed. Four-year-old plants will flower in July, but the seed of old plants is preferred. When the seed is gathered, it is placed in grass-cloth bags and violently shaken in running water to remove the red husks. The seed, which is cream white, is then scattered on a sunk bed of sand, and a thick covering of sand is spread over the seed and watered every day until November. To shield the young seeds from early frosts, the bed is covered with a lath screen, and a straw thatch is put on at night. On the 26th July the seeds are dug up and sorted, and those seeds which have commenced to germinate are packed with sand in jars and buried in a shady place for the winter. The seed beds are carefully measured, and must face exactly N.N.E. ¾ E.

On every 5½ feet (one *kan*) 62 or 63 rows of germinated seed are sown, and from this time the plants require incessant care. As the weather gets

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warmer, they are watered twice every twenty-four hours, and the top mat of the sheds erected over the beds is rolled up during the middle of the day. When the rainy season of the summer solstice sets in, a thick covering of thatch is spread over the sheds, while the back and front are enclosed by rush blinds. Rain and dew must not be allowed to fall on the beds. Extreme warmth and extreme cold are unsuited to the nature of the plant. It is not until 8th November has passed that the grower is able to rest easily. Up to that day he has to be continually on the alert, waging war against insects and weeds. Then, he pulls down the sheds, and having put a layer of 7 or 8 inches of soil on the beds, he leaves the garden to the rigours of winter.

On 21st March of the following year he prepares new beds, and removes the plants to these, placing ten or twelve rows of ten roots each to the "kan" ($5\frac{1}{2}$ feet). These new beds consist of 8 bushels of mulch to 9 bushels of disintegrated granite. The roots now are worth stealing, and the garden has to be watched night and day.

In the following year, after the 21st March, the plants are again moved, and this time the kan contains only eight rows of four roots each. This is intended to be the final planting, but, should the roots not thrive, they are moved to yet another location as soon as possible. Here should be noted a special point in ginseng culture, one which is held as

A Close Secret.

Each time the roots are transplanted they are placed in the ground almost horizontally, slanting slightly downwards. The reason for not planting them vertically are: (1) That water may be evenly applied to the whole root; (2) To prevent the roots from dividing and spreading into fine rootlets, sometimes known as "beard"; and (3) That they may be readily inspected. When the roots are so subject to blight, it is a matter of great importance to be able to inspect them without disturbance. When the plant is five, six, or seven years old, the root is dug up and handed over to the Government. As to

The Profitableness of Sam-growing

as an investment, of course, something large would naturally be expected when one has to wait from five to seven years for a return. From the best information—though it can be hardly considered absolutely reliable—a profit of about 60 per cent. is generally made on the original outlay and running expenses.

Drying the Roots.

During the drying process, the roots will lose two-thirds of their weight. They are first thoroughly washed, and are then brushed with brushes made of human hair. Packed in baskets 2 feet in diameter and 6 inches deep, they are placed in an earthenware steamer. The duration of the steaming is determined by the burning of a torch made of the bark and fibre of the locust-tree. For seven-year-old roots, $4\frac{1}{2}$ inches are burnt; for six-year-old, $3\frac{1}{2}$ inches; and for five-year-old, $2\frac{3}{4}$ inches. The Koreans reckon that this is more reliable than timing by a watch! After steaming, they are exposed to the sun till they stop steaming, and after a little longer exposure are carried to the drying-house. The drying-house is rendered perfectly air-tight, and the roots are placed in trays placed on shelves all round the house. Then three large charcoal fires are lighted in holes in the ground. In half a day the same is taken out, and it then appears red and so hard that it will not yield to the touch. The rootlets are then cut off with scissors. For about ten days the roots are exposed to the sun until they are as hard as stone. In this state they are so brittle that they will break if dropped on to the floor, so it would be impossible to pack them without injury. A foreigner would pack them in cotton wool, but not so the Korean. He simply puts the roots in a hamper, which he places on the earthen floor of a damp storeroom. In a short while the roots soften; they are then removed to a room with heated stone floor, and

spread out covered with sheets of oil paper, being thus left until they are so soft that they will yield to the touch. They can now be easily packed in paper bags and pressed into pinewood boxes without fear of injury. After being packed, they again harden, becoming adjusted to the shape of the box.

THE VIRTUE OF GINSENG

as a drug lies in its aphrodisiacal property. It finds no place in Western pharmacy, but it plays a very important part in the life of both the Korean and Chinese gentleman. Were it not for China, there would be no more trade in ginseng than in several other native drugs of repute. What, then, gives it such a value in that country? The Chinese say that the effect of smoking opium is to diminish the blood, while red ginseng gives energy, strength, health, and increases the flow of blood; hence it is in very high favour as a counteractive of opium. White ginseng, which does not act on the blood, if taken by an opium smoker, will cause speedy death.

American chemists have found no medicinal properties whatever in the plant, and its curative value is imaginary. Still, John Chinaman must have pinned his faith to it when Adam was a little boy, and has held to it ever since. A thousand years from now will find him still holding to his belief in its virtue. The Chinese Prefect who lately visited Brisbane carried with him a box of this cherished root.

It should be noted that ginseng is successfully grown in Manchuria, Korea, China, Japan, and New York State, in America. All these countries are subject to very severe winters, and although every care is taken to shelter the plants from frost, yet it would seem that the frost, which there penetrates the ground to some depth, exercises some occult influence on the roots. Ginseng is not grown in any tropical country, especially not in a moist climate such as that of North Queensland. The only chance of success, judging from all that we have read from the pen of the Rev. C. T. Collyer, from whose pamphlet the above notes are taken, would be to try it at Stanthorpe, where the winters are occasionally severe. Japanese ginseng is said to be quite worthless, and should not be planted.

SOIL INOCULATION.

UTILISATION OF THE NITROGEN OF THE ATMOSPHERE.

Improvements in agricultural science, whether in the direction of working the soil and cultivating crops or in the introduction of new machinery to facilitate farming operations, usually take a long time before being generally accepted by that most conservative body, the farming community. Even to this day the machine which will husk, thresh, winnow, and bag the maize crop is not universally adopted. The cotton-picking machine is viewed with suspicion, but it must be conceded that so many mechanical cotton-pickers and sugar-cane cutting machines have been invented, tried, and found wanting that there is some excuse for cotton and cane planters preferring to sit on the fence and await further developments before adopting them. The same may be said of the potato-digger. There can be no doubt that mechanical science will triumph in the long run, but the time is not yet. The idea of inoculating the soil with nitrogen cultures was met with derision, particularly when it was asserted that a man could carry sufficient material to fertilise four acres in his waistcoat pocket. The failure of the "nitragin" of Dr. Noble, in Germany, further intensifies the distrust in these marvel-working cultures.

A complete scientific investigation of the nature of the organism and its action was, therefore, undertaken by the Laboratory of Plant Physiology of the United States Department of Agriculture, the results of which are published in a pamphlet entitled "Soil Inoculation for Legumes" (Bureau of Plant Industry, Bulletin No. 71). In the course of these investigations many very interesting facts have been brought to light, and the conclusions arrived at are of great importance. The most interesting information to the practical

agriculturist, however, is that dealing with the inoculation of the soil and the effect produced upon the crops grown.

The materials necessary for inoculation as originally issued by the United States Department of Agriculture consisted of three small packages, one of which contained a mixture of sugar, magnesium sulphate, and potassium phosphate; another contained some ammonium phosphate; and the third a pad of cotton wool which had been soaked in a pure culture of the organism, and afterwards carefully dried. In this state the organism retains its activity for some months, while if kept in nutrient agar it loses its activity in a few weeks. It has, however, been found that the dried cultures on cotton are not wholly satisfactory, and further investigations on the subject have resulted in a modification in which the pure cultures of the organism are issued in hermetically-sealed tubes.

The method of inoculation is as follows:—The contents of the first package are dissolved in a certain quantity of clean water, and in this nutrient solution is placed the bacterial preparation. The liquid is allowed to stand in a warm place for 24 hours, being protected as far as possible from dust, and the ammonium phosphate is then added, whereby a further growth of bacteria is induced. After standing for another 24 hours, the solution becomes cloudy from the growth of the bacteria, and is then ready for immediate use.

Either the seed or the soil itself may be inoculated. In the former case inoculation is effected by thoroughly moistening the seed with the liquid and then drying it in the shade; the seed may then be kept for several weeks before sowing without deterioration. Inoculation of the soil is carried out by moistening some dry soil with the liquid, thoroughly mixing this with a further quantity of soil, and then distributing it over the field. In order to test the efficiency of these methods of inoculation, 12,490 packages of material were distributed free by the United States Department of Agriculture between November, 1902, and November, 1904. In this way some 12,500 tests were obtained in almost all parts of the United States, and in many other countries also. Out of 2,502 tests with various leguminous plants, only 26 per cent. of failures were recorded, and many of the latter were due to the experiments having been made in places which were obviously unsuitable for the method of treatment.

The following conclusions may be drawn from the results of these experiments:—Inoculation is not likely to produce any beneficial effect upon soils which already contain the necessary bacteria, or upon soils rich in nitrogen, or, again, upon soils which, on account of their acidity, are unsuitable for the growth of leguminous plants. Inoculation is undoubtedly of value where the bacteria do not already exist in the soil, or have lost their activity, as indicated by failure in the growth of leguminous crops and absence of root nodules.

Scientific men have now discovered a means of extracting the nitrogen from the air. It might here be asked whether the air contains too much nitrogen or merely sufficient to dilute the oxygen. If the latter is the case, there should be a marked effect on all animal life within the radius of the action of the nitrogen extractor.

The Bulletin of the Imperial Institute, Vol. IV., No. 1, 1906, contains the following description of the method adopted for the extraction and utilisation of the nitrogen of the atmosphere:—

The question of the utilisation of the nitrogen of the air for the production of nitrates, to be used for agricultural purposes, has for some time past been the subject of much consideration both by chemists and agriculturists; the discovery of a new process for the production of nitrogen oxides from the atmosphere is, therefore, of considerable importance.

A description of this new process has been given recently by Professor S. P. Thompson in a lecture delivered at the Royal Institution, and information regarding the formation of the company working it has been provided in a recent report by H.M. Consul-General at Christiania. The patentees of

the process are Professor Berkeland, of Christiania University, and Mr. S. Eyde, a Norwegian civil engineer. It consists essentially in the production in a special furnace of an electric flame capable of causing the oxygen and nitrogen of the atmosphere to combine.

In the furnace an alternating arc is produced at from 3,000 to 4,000 volts pressure. The electrodes are placed equatorially between the poles of a powerful electro-magnet, the distance between the points of the electrodes being from 1 to 2 millimetres. Under these conditions a disc of roaring flame is produced, and when ordinary air is blown through the furnace at a definite rate the escaping gases are found to be charged with nitrous fumes. These nitrous fumes are collected, allowed to oxidise still further in contact with the oxygen of the air, and are then absorbed either in water towers or in quicklime. In the latter case nitrate of lime is produced, and the product thus obtained has been shown to be suitable for use as a fertiliser.

Cheap electric power is obtained for the working of the process by utilising the power of several of the large Norwegian waterfalls. The cost of electricity at the works already existing is said to be about $\frac{1}{10}$d. per unit.

BUILDING SILOS.

Have dairy farmers as a body yet arrived at a full knowledge of the great value of the silo as a means of storing fodder for their stock? In travelling round the country, one is struck by the absence of silo buildings on a large number of dairy farms. It must, therefore, be concluded that they are not really acquainted with the properties of well-made silage.

Here and there, however, there are dairy farmers who realise the value of silage to its fullest extent, as will be seen by the following, which we take from the "Silverwood Gazette":—

Mr. H. Hamlyn (of Helidon) is an experimentalist, and one of the most up-to-date dairymen we have. As a result, he has not waited for the Government or anyone else to teach him how to build silos or to make ensilage. He has used his own common sense in dealing with a problem which must be obvious to most dairymen operating in our unreliable and variable climate.

Mr. Hamlyn has forwarded to the office of the Silverwood Dairy Company a sample of ensilage which he made, and he states, in a letter accompanying the sample:—

"Last summer we had nice rains, and everything simply grew faster than we could use it. Seeing everything growing so fast, and the prospects of another good cutting ahead, I decided to put my surplus fodder into a stack of ensilage, and started with sorghum, then lucerne, and penicillaria. We laid a few old logs so as to have a fairly level foundation, and then commenced operations, the sorghum being cut with a mower, and we only cut what we could stack that day, so as to have the stuff fresh. We continued this for about three weeks, when we rested for a few days to allow the stack to settle down. We put in about 180 dray loads, and decided to secure same, and cover the stack with old dry hay. We left the silage until about the beginning of July, when we opened it for use, and, seeing that it was all right and wishing to convince our dairymen what one man can do another can, I exhibited the ensilage at all the different shows, and secured four first prizes and two seconds. We had a real good second crop of sorghum, and were able to give the cows sorghum and ensilage, while the other farmers had near nothing."

The arguments in favour of ensilage for feeding stock are unanswerable, and we hope farmers and dairymen will take time by the forelock, and make provision this summer.

[While congratulating Mr. Hamlyn upon the satisfactory results achieved by him, we do not, of course, quite approve of his idea of making ensilage, and would direct dairymen's attention more to the methods employed by Mr. Clifton, referred to in our last issue of the Journal.—ED.]

AGRICULTURAL EXPERIMENTS AT STATE SCHOOLS.

No better justification for the lately instituted courses of agricultural instruction for State school teachers, at the Agricultural College, could be advanced than the practical work which has consequently been undertaken by several of the teachers. As an example, we may cite the work of Mr. Thos. Henderson, head teacher of the State school at Glencoe, Gowrie Junction. Mr. Henderson obtained seeds and plants of various grasses, cereals, sweet potatoes, rape, &c., and he and his pupils set themselves earnestly to experimental work, mainly in the direction of products suitable for feeding dairy cows and pigs, Gowrie being essentially a dairying district. He has sent in a report of the work to the Minister for Agriculture, which goes to show the usefulness of the instruction gained at the College. In the matter of prairie grass, for instance, the first experiment was carried out in the school plots, and since then one farmer has sown 30 acres of this grass, out of a 90-acre farm; another has 20 acres, another 10, another 5, and next year will see most of the farmers with prairie grass as the main winter feed. Rye grass has also been successfully grown. Thousand-headed kale, vetches, and paspalum have done well, and mangel wurzel averaged 51 tons per acre. Sweet potatoes were found not to do so well as on the Brisbane River lands, where the soil is lighter. The rich black soil of the Downs produces too much vine. Mr. Henderson suggests that school committees be advised to plant all new scrub soil school paddocks with a mixture of cocksfoot, rye, prairie, paspalum, and white clover to prevent a free growth of noxious weeds. We fear, however, that the paspalum would outgrow and eventually destroy any other grasses sown with it.

MORE ABOUT DRY-LAND FARMING.

Within recent years, says "Country Life" in America, the possibilities of dry-land farming have begun to be realised, not only by the Department of Agriculture, but by the various experiment stations in the arid States.

The old rain belt was formerly considered as limited to the area in which the average rainfall was about 20 inches per year. Dry-land farming, however, is now being successfully practised in many localities where the rainfall ranges from 8 to 15 inches per year.

In parts of Montana, spring wheat and alfalfa yield large and profitable crops without irrigation, and with a rainfall of 12 inches. Similarly in Utah dry-land farming has yielded excellent results with wheat, barley, and, to a somewhat less extent, alfalfa. In the interior of Oregon there are immense areas planted to wheat and yielding 20 to 25 bushels per acre with a rainfall not exceeding 8 inches per year.

The results obtained by the thousands of farmers who are engaged in the line of agriculture have called attention to the great possibilities of dry-land farming, and have made it apparent that there are thousands of acres of land containing almost unlimited plant food, which will yield good crops under a system of dry-land farming, and which have heretofore been considered irreclaimable.—"Mexican Investor."

HARDINESS OF MAZZAGUA.

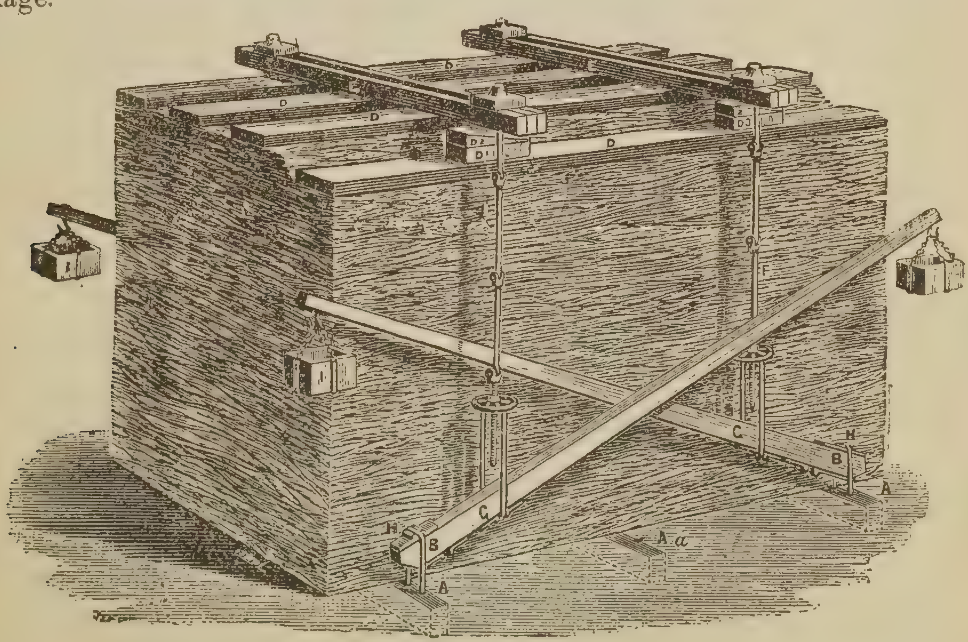
This comparatively new fodder plant has hitherto not brought any seed to full maturity where it was sown last year. It produced an abundance of stalks of phenomenal height, and also flowered, but no seed resulted. A few seeds we sowed in October, 1905, yielded splendid stalks; and, ten months later, flower heads appeared. These came to nothing. The stalks by this time resembled nothing so much as extremely hard sugar-canes, with joints about 6 inches in length. In September, 1906, the plants were rooted out, leaving

only one, which shortly afterwards threw out numerous fresh shoots from the head and from every joint as well as from the roots. By the end of October fresh flower heads appeared, which, in a surprisingly short time, matured well-filled seed, which, but for legions of sparrows, would have been ripe about the middle of November. Thus this plant survived all the winter months, when several severe frosts occurred, which would have completely destroyed maize and sugar-cane. We believe that, if cut when very young, mazzagua would be an acquisition to our fodder plants, whether for green food or for the silo, but later on the extreme hardness of the stalk would render it useless for such purposes. Another objection is the length of time which it takes to mature the seed. Farmers cannot afford to grow a cereal crop which yields no return for 12 months, when there are other equally and far more valuable crops which mature their seed in half the time, and which can be utilised almost up to the date of maturity in the silo.

ENSILAGE STACKS.

In cases where a farmer cannot afford to build a proper silo, there is no reason why he should not be able to make silage in stacks—in fact, as we stated in the last issue of the Journal, some men make very large stacks of green fodder, in addition to building silos. In finishing off an ensilage stack it is necessary to have some means of weighting it down to exclude the air. We have just received from a gentleman in Brisbane the description of a cheap ensilage lever press ("The Blunt"), manufactured by the Ensilage Press Company, Leicester, England. As this may be of interest to farmers, we add a few illustrations of the working of the press, the total cost of which is £10.

As far as stacks are concerned, they may be of various shapes and sizes. A round stack has a much less percentage of waste than any other shape, and is more easily kept upright. A square or oblong stack, measuring 300 superficial feet, will have about 70 feet round the sides. A round stack, measuring 300 superficial feet, has only about 60 feet of outsides, equal to a saving of 14 per cent.; besides this, there is always a considerable loss at the corners of a square or oblong stack, which is entirely saved in a round one. Stacks may be made as large as 20 feet in diameter, and sufficiently weighted with one pair of rods and levers. This reduces the cost of weighting ensilage to a mere trifle. A round stack, 20 feet in diameter and 15 feet high, contains about 100 tons of silage.



FROM THE COMMENCEMENT.—Great care should be taken to keep the sides level all round and rather higher than the middle, the sides trampled as much and the middle as little as possible—particular attention is called to this instruction, which is given with a view to obtain equal pressure when the press is applied, as the sides of the stack sink more rapidly than the middle.

SOUR SILAGE.—For this the crop must be in a very succulent state, and the stack built up as quickly and pressed as soon as possible, and the temperature kept down to about 120 degrees Fahr. This sort is suitable only for dairy cows and store stock, and is quite unsaleable in towns on account of its strong pungent smell.

SWEET SILAGE.—This sort is suitable for all purposes. If wanted for dairy or feeding cattle or store stock, the temperature should be kept as near 140 degrees Fahr. as possible, sooner lower than higher.

If for horses or sale, the temperature should range from 140 to 160 degrees Fahr.; the crop should be stacked in moderately fine weather, as very wet silage, however high the temperature may have reached, is unsuitable for sale, and will not keep horses in such good condition as silage stacked in fairly dry weather and free from rain water. Such have been the satisfactory results from the use of silage for horses in winter, both on the farm and in the town, that we are confident in asserting that in a few years, more silage than hay will be used for this purpose.

TO MAKE SWEET SILAGE.—Should the weather be wet and the crop in a succulent condition, it may be either allowed to remain on the ground for a day or two after being cut or, if stacked immediately, the stack should be built up slowly, not more than 5 or 6 feet a day; and should it be found convenient to miss two or three days between one stacking and another, no damage will be caused to the silage; but not more than four days at the most should elapse between each stacking unless the press is applied, but it may be easily removed and replaced, if it is desired to add to the stack at any time afterwards. If the crop is old or the weather dry and hot, it cannot be stacked and weighted too quickly nor too heavily.

CROPS FOR SILAGE.—Artificial grasses and clovers make the best silage for horses; where lucerne can be grown, it is most valuable for silage; it should be cut when in flower.

One of the best mixed crops to sow in the autumn is tares, wheat, and beans in the following proportions:—About 2 bushels of tares, ½-bushel of wheat (a late sort), and ½-bushel of winter beans to the acre. This crop should be cut before the wheat bursts out into ear or just as the pods begin to show on the beans or tares.

Oats or wheat grown alone should be cut just before they burst out into ear; beans just as the pods begin to form, and before any of the leaves begin to fall.

These crops require more heavily weighting than the common grasses and clovers.

DESCRIPTION OF THE PRESS FOR A ROUND STACK.

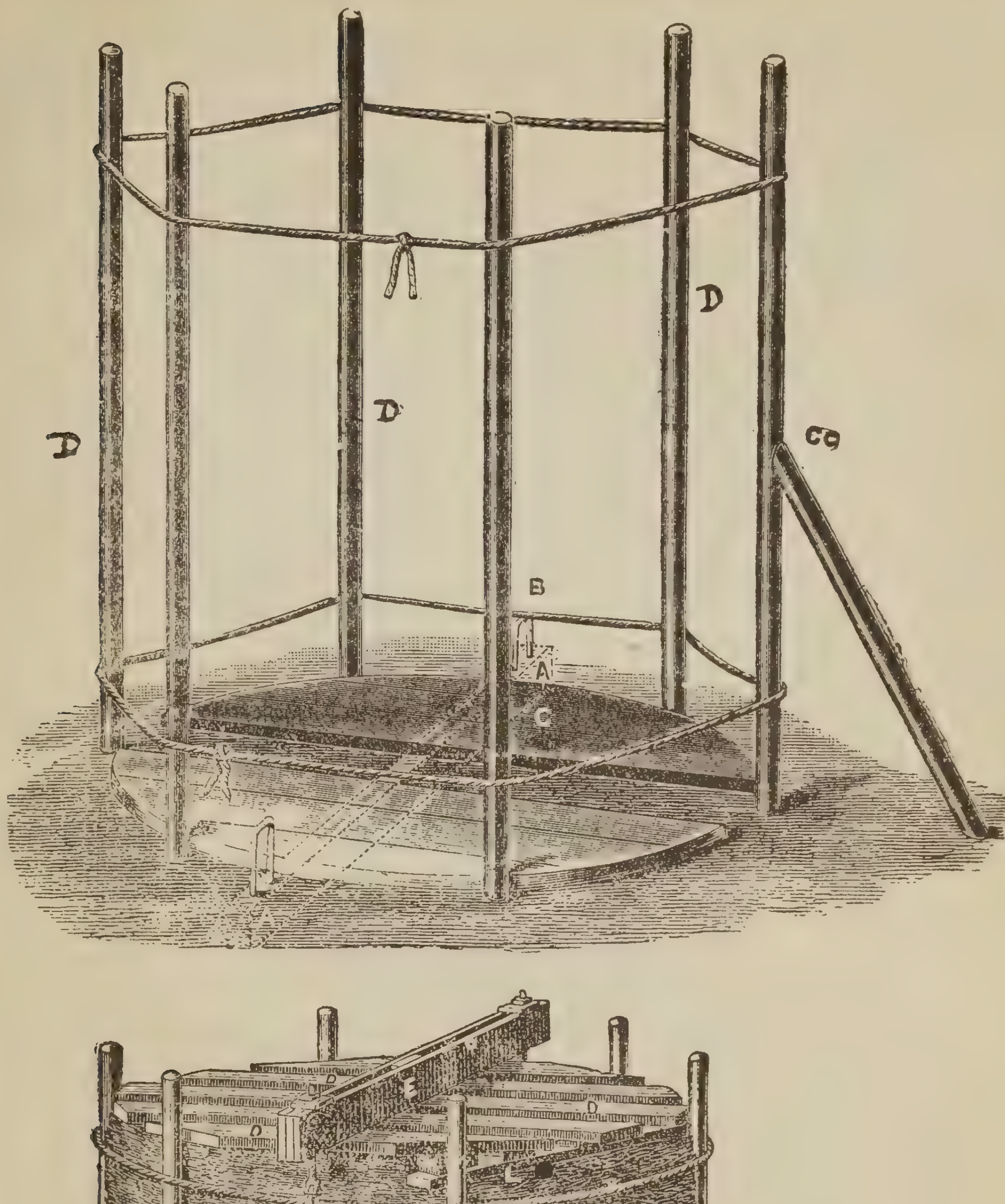
A is a strong beam or pole, called the fulcrum beam, which is sunk in the ground so as to be level with it.

B, fulcrum staples, which are securely fixed by means of nuts and screws into the ends of the fulcrum beam.

C, strong board, such as old railway sleepers or slabs, laid across the fulcrum beam, 20 to 30 inches apart, as near to the side of the stack as possible.

D are three pairs of wooden poles, which are bound together above and below by ropes.

E, cross beam laid across the covering planks.


D
D
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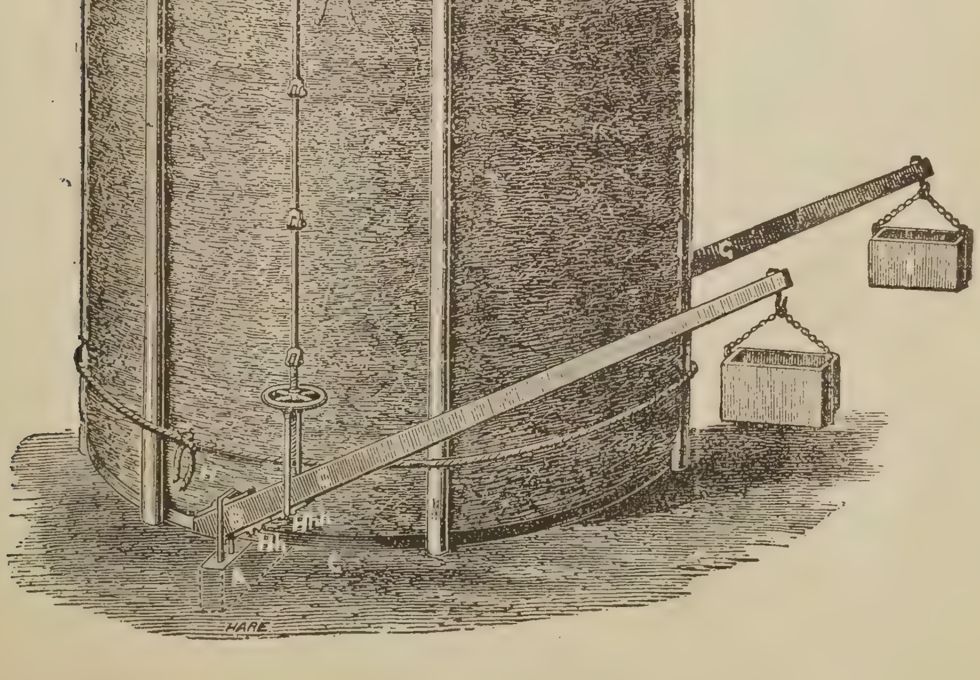
E
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F, screwed rods, passing through the cross beam E; through the stirrup at the lower end place the lever G, allowing the tip H to catch under the staple B.

I, box at the end of lever G, in which bricks or stones are placed according to the weight required.

AA—When the stack is large enough for two pairs of rods, it is better to place the large fulcrum beam AA in position, so that when part of the silage has been used the staples and cross beams may be moved so as to work from the central fulcrum beam; by this means the pressure may be kept on the ensilage till the last cutting is begun.

To Take the Silage from the Stack.

Where two pairs of rods are used, lower the levers by means of the screw and wheel until the pressure is removed from the cross beams E, then drive the beams D back as far as necessary; then raise the lever into position again, and cut the silage from top to bottom, repeating this as often as necessary, until all is consumed up to the cross beam; then remove the cross beam and staples to the central fulcrum beam AA, and cut as in the first instance. When one pair of rods only is used, drive back the beams D, as described above, but cut on each side of the cross beam so as to leave the weight on till all is consumed, except $1\frac{1}{2}$ to 2 feet on each side of it.

For the short time between the removal of the weight and the consumption of the silage, the exposed part of the stack should not be covered up.

School Gardens.

Nothing contributes so much to attract even city dwellers to a country life as the study and practice of agriculture and horticulture in early youth. It is, therefore, a cause for gratification that the Minister for Education has moved the Government to place a sum of £250 on the Estimates for the purpose of encouraging horticulture, elementary agriculture, and arboriculture in connection with the State schools. The following are the provisions of the scheme prepared by the Department of Public Instruction:—

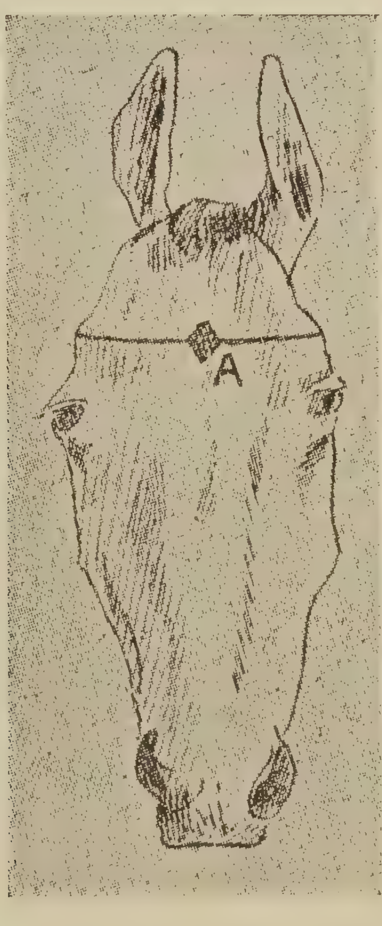
Three prizes to be granted to each of the twelve school inspectoral districts—first £4, second £2, and third £1. The prizes to be awarded for the best kept and most attractive school grounds or gardens, or for the best agricultural experimental work or the like. The awards to be made on the recommendation of the district inspectors of schools. The prize money to be expended by the teachers in further improving the school grounds or in the purchase of implements, useful books, or periodicals, &c. The Department to supply, on applications recommended by the district inspectors, seeds and plants, wire-netting, simple garden tools, and farm implements, or such other apparatus as the Minister may approve. Seeds and material will only be supplied to those teachers who are likely to make good use of them, and the ordinary reports of teachers regarding their annual arbor day proceedings are to include a report upon their experiments. The Department of Agriculture has agreed to instruct its experts to visit country schools as far as practicable, and give to the pupils and teachers such guidance and help as they can afford. A copy of the "Agricultural Journal" will be supplied each month to each school engaged in this special work; and the Department of Agriculture will include in the Journal a school section of one or two pages, which will contain simple and useful hints to teachers and scholars in matters of interest in regard

to agriculture, seed-testing, dairying, school gardens, tree-planting, and cognate subjects. In selecting teachers for future courses at the Gatton College, preference will be given to teachers who are bestowing attention on work of this kind.

The work above outlined is to be done under the "Nature knowledge" section of the school syllabus, and is not to be permitted to trench unduly upon the other work of the school. Many teachers in the country districts have taken up simple agriculture as their branch of "Nature knowledge," and some good, practical, and useful work is being done. It is work in which the children take a keen interest, and from which they reap much practical benefit. One or two teachers whose schools are adjacent to butter factories take dairying as their special subject. The factories have been placed at their disposal for several hours each week, and the elder children are taken to the factories for occasional lessons and demonstrations.

HOW TO SHOOT A HORSE.

Sometimes, unfortunately, a horse has to be killed, and it is then found to be by no means simple to one inexperienced without being cruel. How often do we see a horse that has met with an accident simply butchered owing to the



ignorance of the person who undertakes to put it out of its misery. To shoot a horse so as to kill it instantly, it is only necessary to aim so that the bullet will enter the brain by passing through a spot in the centre of the forehead above the eyes at the spot marked A in the sketch.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

Returns from 1st to 31st October, 1906.

Name of Cow.	Breed.	Date of Calving.	Yield of Milk.	Babcock Test, Per cent. Butter Fat.	Commercial Butter.	Remarks.
			Lb.		Lb.	
Butter ...	Shorthorn ...	11 Aug., 1906	769	3·5	30·14	
Bliss ...	Jersey	3 May ,,	559	5·2	32·55	
Dora ...	Shorthorn ...	29 May ,,	699	4·2	32·88	
Dott ...	,, ...	14 Aug. ,,	784	4·9	43·02	
Gem ...	,, ...	29 July ,,	759	3·0	32·10	
Hettie ...	Ayrshire Sh rth'rn	28 Jan. ,,	463	5·6	29·03	
Honeycomb	Shorthorn ...	19 July ,,	653	4·6	33·64	
Kit ...	,, ...	17 April ,,	627	3·8	26·68	
Lady Ring ...	Guernsey ...	17 Nov., 1905	383	6 0	25·73	
Lass ...	Ayrshire	15 Mar., 1906	631	4·6	32·50	
Lottie ...	,, ...	7 July ,,	569	4·0	25·49	
Magpie ...	Holstein Sh'rth'rn	4 Feb. ,,	677	3·4	25·88	
Mona ...	,, ,,	16 Jan. ,,	671	3·4	25·55	
Nellie 2nd ...	Shorthorn ...	29 July ,,	578	4·2	27·18	
No. 6 ...	,, ...	3 July ,,	537	4·2	25·26	
Poppie ...	Guernsey-Jersey	13 Feb. ,,	503	4·8	25·69	
Princess ...	Shorthorn ..	28 July ,,	638	4·0	28·58	
Restive ...	,, ...	3 Aug. ,,	669	4·1	30·72	
Rosalie ...	Ayrshire	5 July ,,	694	3·8	29·53	
Rosebud ...	,, ...	3 Sept. ,,	887	4·0	39·53	
Winnie ...	Shorthorn ...	11 Sept. ,,	847	3·0	28·45	

SUGGESTED GRADING OF DAIRY PRODUCE IN GREAT BRITAIN.

Mr. J. A. Kinsella, New Zealand Dairy Commissioner, who lately returned from an extended tour through South Africa, the Argentine Republic, the United Kingdom, and Denmark, furnished the Minister for Agriculture with a most exhaustive and instructive report on the agricultures of these countries, with special reference to dairying. Amongst other matters, he deals with the proposal emanating from some persons in New Zealand to send an official grader to London, in order that a report could be made as to the quality of New Zealand butter when opened upon the market at home. When this subject was discussed by the Dairy Association of the South Island, during the time of Mr. Kinsella's former connection with the Dairy Division, he expressed disapproval of such a step being taken, and after his recent investigations in London he sees no reason to change his views. In fact, he declares that the sending of a man home to grade the butter and cheese would be found to be entirely impracticable.

After the arrival in London of a vessel carrying New Zealand dairy produce, as soon as a sufficient number of the various brands required for immediate delivery are sorted out, the owners or agents are in attendance to clear the produce, which is forwarded on to their customers at once. It will, therefore, be easily understood that a grader sent from the colony would have no chance of examining the butter, even if the firms handling it were agreeable.

The owners of the butter would certainly not sanction any interference with their packages of dairy produce at this juncture, and, even if they were agreeable, the opening of the boxes would be futile, owing to the contents being in a frozen condition. Large quantities of the butter are carted direct from the dock sheds and distributed throughout London. When the butter is placed in the dock sheds, each factory's brand is separated and stacked by itself. Mr. Kinsella was permitted to examine some shipments of New Zealand butter immediately after it was placed in the shed; but, owing to the fact that it was frozen so hard that it was impossible to insert a trier, he was unable to pass any judgment on the butter.

He considers that the only possible way which could be suggested for the grading of the produce in Great Britain would be for the New Zealand Government to acquire large storage accommodation in London and other centres, and to have all the butter consigned direct to them at these places and examined. Besides requiring a very large number of men to undertake this work, the butter would have to be defrosted, which would entail a delay of from five to six days. The services of not less than half a dozen graders would be required to cope with the work in a reasonable time. Even if this system were possible, there would be the danger of the produce missing a brisk market by being held for a number of days after its arrival in London. Such a scheme would, of course, never be seriously entertained by anyone with a knowledge of the subject; yet there are people in this country who claim that our butter and cheese should be regraded in Great Britain.

A much simpler and more feasible way of testing the keeping quality of our butter can be adopted in the colony by grading and storing a few boxes of butter from each factory for, say, two months, and holding it under similar conditions to those of the butter shipped to Great Britain, when it could be thawed out and examined. This plan has already been tried on a small scale at the port of Wellington, and the result in every instance has been that the grader's judgment in the first place has been verified.

UDDER TROUBLES.

The "Silverwood Gazette" has the following article on udder troubles, by Dr. Peters, of the Nebraska Experiment Stations, and we quite concur with the suggestion that the article should be filed for reference, as it will answer many inquiries on the subject:—

"Probably all dairymen know that each year they lose considerably from this source, and for that reason I have made it quite a study, so as to bring out some method by which we could save a large per cent. of these udders that are caked soon after calving. We find very often a very good cow that has a diseased quarter, the quarter becoming diseased after the first or second calf. The usual methods that are adopted are something like this: They will put on, say, a hot fomentation, or a liniment, or some kind of vaseline, and then, when the system becomes clogged, they will use what is known as a probe, sometimes a darning needle, and with that kind of material they usually ruin the udder. They will have a large quantity of bloody milk, and then, in a little while there is no flow from that quarter at all; and the result is, the cow is spoiled.

"Now, the udder is to be considered something like a sponge; it is very porous, full of holes, and for that reason it is a very delicate member, and it wants to be treated in that way. I am not a dairyman, but I am told that some milkers have a less gentle touch than others, and there is an irritation caused, and this irritation will produce serious results by clogging up these little tubes;

and the result is that the quarter will be gone, if not the entire udder. Now, then, the question is what to do? You have probably tried a great many things, but I have found this the best remedy, and it is something that farmers can do. The secretary told me that the greatest trouble with us veterinarians is that we try to give the farmers something to do that is hard for them to do. I have here an ordinary milk tube, with a little bibb at the end of it. I use a rubber tube, something like an ordinary hand bicycle pump. Now, I insert this tube carefully into the quarter that is affected, and I fill it up with air, and it is like filling a sponge with water. If the udder is caked, you put in as much air as you can. Then you massage or work with your hand, and work that air all though the quarter, and you will hear the bursting of these little vesicles—these little tubes. You can burst all of them in two or three applications of that kind, and you will generally restore the udder. I have treated several hundred very bad cases, and I know it works all right, and any of you can easily do it.

"Now, where the entire udder, soon after calving, has become caked, we use what is known as the compress. We take a piece of heavy cloth, and put it on so that it lifts up the entire udder, and tie it on top. We usually use straw with it, so that we do not chafe the back of the animal. That is to relieve the pressure. You will notice that the udder is very heavy, and that the pressure must be relieved before anything else is done. If you want to assist, take several small 5 or 10 lb. bags, and fill them with bran, keep them hot, and apply them to the udder. That is the treatment that we use where there is a very great amount of congestion. Now, these are about the simplest methods of treating diseases of the udder that I can explain—the massage for the diseased quarter, and the compress for the whole udder."

DUST-LAYING WITH OIL TAR.

The method of laying street and road dust by watering may be described as a mere sham. If the surface of the road is only lightly watered, the dust reasserts itself on a busy road within a very short time of the watering. If the surface is saturated, watering makes the roads worse than they would be without, because the water softens the foundations, which eventually work to the top in the form of dust. There have been dust-laying liquids tried, but all have proved failures because they had the effect of softening the surface and turning the road so treated into a soft, sticky mud, destructive to the road, injurious to varnished vehicles, and dangerous to cyclists. The difficulty, we learn from an exchange, has been practically overcome by Mr. H. Burrows, surveyor to the Lathom and Burscough Council, England. His experiments were made with oil tar, and they appear to have given him complete satisfaction. In his report he says that the best result was obtained by not sweeping the road before applying the tar, the dust appearing to absorb the fluid and form a kind of protective carpet which deadened the sound of passing vehicles and preserved the surface from abrasion by horses' hoofs. One special advantage oil tar possessed over the ordinary commercial dust-layers was that it was a perfect mud preventive during or after rain.

Oil tar certainly is a lasting dust-layer, for at the end of six weeks it was as good as when first applied. The cost is by no means prohibitive. The first application worked out at about £15 per mile for a 6-yards road. He considered that two dressings should be applied during the summer, the second at the end of about six or seven weeks, which would bring the expense to £22 per mile. The oil tar would not have any injurious effects on the tires of motor cars or bicycles.

Botany.

CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

BY F. MANSON BAILEY, F.L.S., Colonial Botanist.

Order AMARYLLIDEÆ.

EURYCLES, Salis.

E. Cunninghamii, *Ait., var. Whittlei var. nov.* Bulb nearly globose, about 2 in. diameter. Leaves several, petioles 10 in. long; lamina 10 to 12 in. long, 4 to 6 in. broad, shortly tapering at the base on to the petiole, somewhat abruptly acuminate at the apex; lateral nerves prominent, 7 on each side of the midrib, mostly starting from near the base of lamina. Scape about 3 ft. high, about ½-in. diameter 6 in. from the base. Flowers in umbel 12. Involucral-bracts 3 to 5, of unequal width, some long as the pedicels, others shorter, with also a few filiform ones or bracteoles. Pedicels about 1¼ in. long. Ovary deep-green and glossy. Perianth 1¼ in. long, expanded flower about 1½ in. diameter, the segments much imbricate. Corona about 7 lines long, the tube and lobes of which are of equal length. Filaments scarcely exceeding the corona lobes; anthers yellow. Style slightly exceeding the filaments.

Hab.: This grand variety was found by *Mr. R. Whittle,* he informed me, within 10 miles of Brisbane.

RABBIT EXTERMINATION.

In order to bring to a successful issue the method of exterminating rabbits advocated by Mr. Rodier, and which has for its motto, "Kill the females and let the males live," the natural law of "survival of the fittest" must come into operation, and it appears to have been accepted that when the males predominate and become the superior sex the females necessarily become exterminated. There, however, exists a theory, accepted by some as a natural law, which tends to avert the extermination of a species of sexual preponderance—namely, the theory of "cross-heredity of sex"—the doctrine of which is that the better nourished and superior parent tends to produce the opposite sex. This theory of "cross-heredity of sex" is strongly supported by the result of the test, for in pen No. 1 (which originally contained 9 does and 3 bucks), of the increase 15 were females and 9 males; in pen No. 2 (originally containing 6 of each sex), of the increase 21 were females and 4 males; in pen No. 3 (originally containing 8 does and 12 bucks), 11 were females and 5 males; in pen 4 (originally containing 4 does and 12 bucks), 7 were females and 4 males; in pen 6 (originally containing 11 does and 1 buck), 7 were females and none were males. Pen 5 was apparently not used for breeding.

The result of this test may be summarised as follows:—

1. Preponderance of males tended to decrease the number of young;
2. The males, when in excess, did not generally worry the females to death;
3. The males did not worry each other to any great extent.

It would appear that Mr. Rodier's method resolves itself into a pertinacious effort to kill the last elusive doe.—"Hawaiian Forester."

The Orchard.

FRUIT AND VEGETABLE GROWING ON THE CLEVELAND LINE.

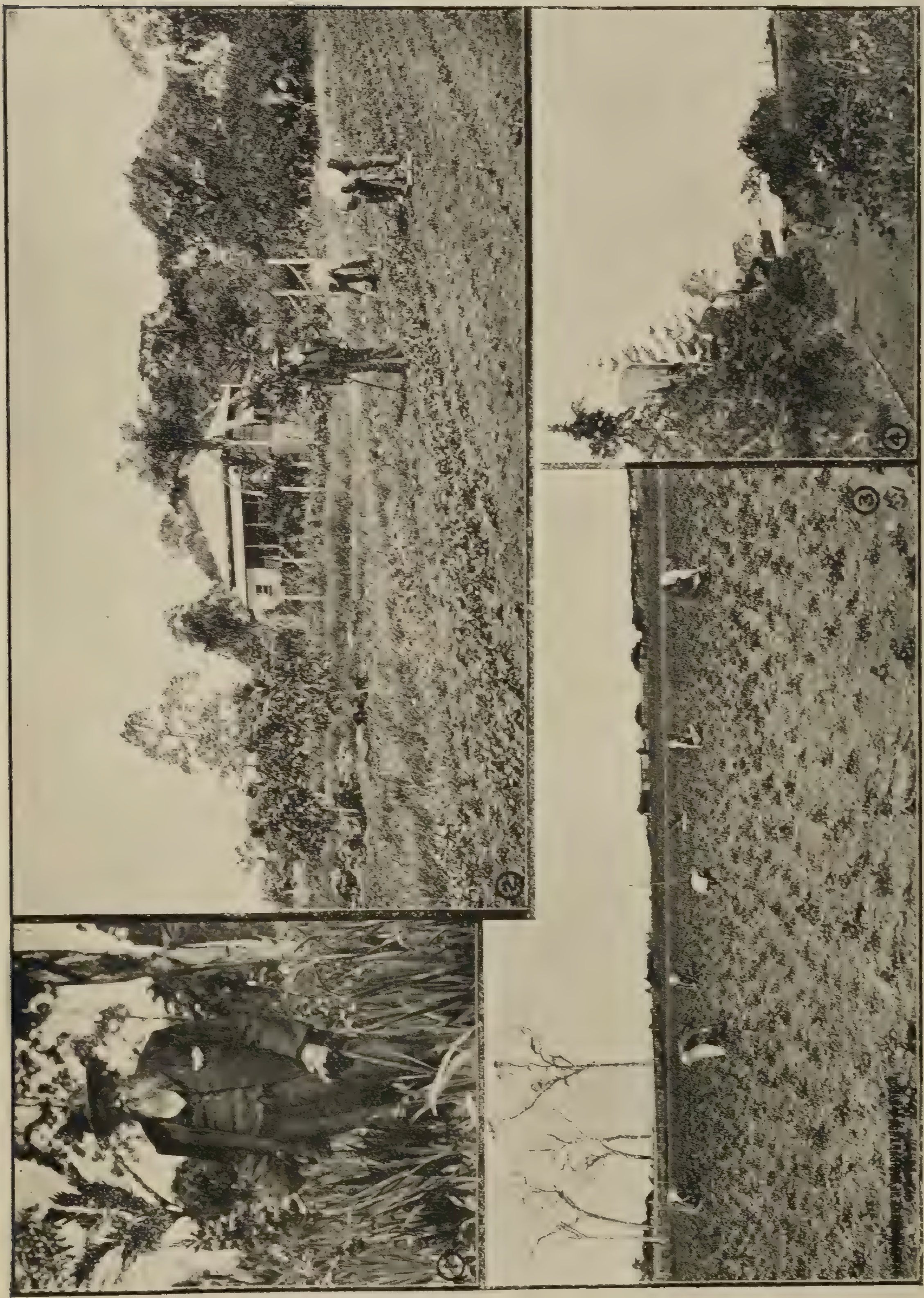
By ALBERT H. BENSON.

Close to Brisbane, on the south side of the river, adjacent to and served by the Cleveland line, and extending south as far as Redland Bay and Mount Cotton, is one of the largest and best fruit and vegetable producing districts in the State, and one in which these industries have made rapid progress during the last few years. The district first came into prominence many years ago as a producer of sugar, and was practically the cradle of the sugar industry as far as Queensland is concerned; such well-known men as the late Hon. L. Hope, of Ormiston, and the Hon. Angus Gibson, of Bingera, being amongst its pioneer growers. Sugar was grown at Hemmant, Tingalpa, Ormiston, Redland Bay, and Mount Cotton, and a number of small mills were erected, the last of which, at Mount Cotton, was only dismantled some eight or nine years ago. Sugar, however, gave way to fruit-growing, and Redland Bay and Mount Cotton soon became noted as producers of excellent bananas, pineapples, and other fruits—a reputation that they have sustained for many years. Fruit was not, however, confined to these two parts of the district, as citrus fruits, mangoes, &c., were planted in different places, particularly in the Wellington Point, Ormiston, and Cleveland districts, and, though many of the oldest trees succumbed during the recent severe drought, they have done well generally, and have produced fine-quality fruit.

Within the last ten years there has been a great change, and, in addition to the growth of the fruits mentioned, the district has rapidly come into the front rank in the production of strawberries, pineapples, passion fruit, tomatoes, cucumbers, and other vegetables. A number of small holdings are being profitably worked, and, instead of a large area of unproductive forest land, there are now many prosperous settlers scattered throughout the district, and the whole of the available and suitable land is rapidly being placed under an intensive system of cultivation.

Leaving South Brisbane Railway Station for Cleveland, we will step off at Manly, 13 miles, as the first of the fruit-growing country starts here in the Tingalpa district. To the south of the railway line there are several forest ridges that are fairly free from frost that are being planted in pines, strawberries, tomatoes, and other vegetables. The soil is a medium loam, in places inclined to be a heavy loam, of a red colour, with generally a fairly stiff subsoil. It is by no means rich, but grows good pines when the drainage is right, and suits strawberries well. Seville oranges, figs, Chickasaw plums, persimmons, rosellas, and tomatoes do well, and at the Springs Garden, where Mr. Hargreaves has his home and fruit-preserving works, these fruits can be seen growing to great perfection. There is also soil of a sandy loamy nature in the district, some of good depth and possessing excellent drainage, and when above frost line this is well adapted for the growth of pineapples, but will, however, require generous manuring to produce the best results. Strawberries do best on the heavier soils, and the following kinds do well:—Aurie, Annetta, Trollop's Victoria, and Glenfield Beauty. The two first-named will stand plenty of manure, as they like rich ground; Trollop's and Glenfield, the latter especially so, are heavy bearers, and in a good season will produce at least 3 tons of berries to the acre. Many Federator strawberries are also grown, but, in my opinion, the soil is not the best for this kind, as they are apt to scald and burn off, and do much better on colder and damper soils. The fruit land is all close to the railway, and the presence of a preserving works in the district should be an

Plate XXI.



1. Mr. Jas. Pink amongst his Gladioli, Wellington Point.
2. Mr. Pink's Residence, showing New Seedling Strawberry, "Made to Order," in foreground.
3. Mr. K. Cross' Strawberry Garden, Wellington Point.
4. Mr. C. French's Nursery, Wellington Point.

inducement to plant all suitable land in fruits or vegetables. Mr. Hargreaves is the pioneer fruitgrower in the district; his orchard is a credit to the State; and, up till quite recently, he has had it pretty well to himself, but now there are several areas of land either newly planted or about to be planted, which, if looked after properly, will, I have no doubt, bring in good returns.

Continuing towards Cleveland, Birkdale is reached at 17 miles. Here the fruit-growing country is a continuation of the Tingalpa ridges, and the soil is similar to that at Manly, with this difference, that there is some sandy, loamy soil with gravelly subsoil that, with generous manuring, should grow excellent pineapples. Pineapples, strawberries, tomatoes, &c., are grown on the red soils, as are also a few fruit trees of kinds, but not to any extent. The remarks I made with regard to the Manly soils are equally applicable to this part of the district.

Some 2 miles further on, Wellington Point is reached, the deep red soil of the railway cuttings near the station giving a very fair indication of one of the types of land to be met with in this part of the district. Here the fruit and vegetable land is on both sides of the line, that to the north extending to the Point proper, and to the edges of the bay. On this side of the line there are some fine strawberry and pineapple gardens, that of Mr. K. Cross containing some 7 acres of strawberries and 7 acres of pines being shown in one of the illustrations herewith. There are also some fine patches of orange-trees, though not of large extent, that are looking remarkably well at present, and have stood all droughts and diseases without any special attention, thus showing the suitability of the soil and climate to the production of this fruit. The soil on this side of the line varies from the deep red loam seen in the railway cuttings to a grey, almost swampy, soil at the lower end of Mr. K. Cross's strawberry patch, and to a shell sand, and gravelly ironstone nodules at Mr. Burnett's, with several types intermediate between them. On the south of the line, all along the main ridge, the soil is of a similar nature to that seen in the railway cutting, tapering off on both sides gradually to tea-tree swamps, with graduations in colour of the soil, from red through brown to grey, yellow, or even black. On the main ridge the bulk of the land is planted to pines, and growers such as Messrs. K. Kefford and A. J. Shapland have respectively 25 and 22 acres under this crop. Illustrations are given of their gardens and homes, and it will be noted that, in addition to growing pines, the land is carrying a heavy crop of tomatoes—a common practice throughout the district. Beans, cucumbers, strawberries, and sometimes cabbages are also grown between the rows of pines, and the land is thus cropped to its utmost capacity, and is always bringing in something. Such a practice necessitates systematic manuring, and this is carried out. The cultivation of table grapes has been started, and last year the results were good. Wellington Point has a live A. H. and I. Association, which, besides holding an annual show in July, has a number of meetings throughout the year, at which subjects of interest to farmers and fruitgrowers are discussed, with benefit to those interested and to the district generally.

The main ridge to the south of the line is not the only fruit-growing land on this side, as about half a mile to the west there is a second ridge, extending right up to the line, on which there are several strawberry gardens, as well as the nursery of Mr. French, and the garden and residence of Mr. James Pink. Illustrations of these are given, from which it will be seen that not only is the district suitable for the growing of fruits and vegetables, but that flowers of many kinds, palms, and ornamental plants thrive splendidly. The soil and climate is especially adapted to the growth of bulbs, and Mr. Pink's collection of gladiolus and amaryllis is a very fine one. Mr. James Pink, who is seen amongst his flowers (Fig. 1, Plate XXV.), is a thoroughly practical horticulturist, with a lifelong experience, and it is to his energy and enthusiasm that the district is mainly responsible for the great improvement that has

taken place in the culture of strawberries, and in horticultural matters generally. Mr. Pink has raised many seedling bulbs and flowers of great beauty, and, by means of careful cross-fertilisation, he has produced several valuable kinds of strawberries, one of raspberries, and numerous seedling pineapples. The well-known Pink's Prolific strawberry, undoubtedly the finest flavoured berry we have in Queensland, is one of his crosses, and now he has another which he is fruiting in quantity this year that promises to be a very valuable acquisition to our present list of good varieties, and has just been placed on the market. This new berry is called "Made to Order," and is of a strong and vigorous habit of growth, is free from leaf blight, a good bearer, producing fruit of good colour, size, and quality. It is a cross between Trollop's Victoria and Marguerite, and is shown in the foreground of Fig. 2, Plate XXV., which accompanies this article.

Mr. French's nursery (Fig. 4, Plate XXV.) produces excellent roses, bulbs, pot, and flowering plants, and is worked in conjunction with a strawberry garden in which many varieties are grown and tested to prove their suitability to the soil and climate.

There are a number of fine old orange and mango trees in the district, and fruits such as papaws, passion fruit, granadillas, custard apples, peaches, guavas, figs, &c., are grown in addition to those already mentioned.

Continuing the journey towards Cleveland, we next come to Ormiston, whose gardens join those of Wellington Point on the south of the railway line, and extend on the north side of the line as far as Ormiston House, on the western shore of Raby Bay. The fruit land is mainly confined to the red forest ridges, the intervening low swampy land not having been cultivated to any extent, so far, though, with drainage, there is no reason why it should not grow good strawberries and vegetables, particularly as there is an excellent supply of water, which could be used for irrigating during dry times. The growing of strawberries, pineapples, and citrus fruits, as well as cucumbers and tomatoes, are the principal industries, and one of the oldest and largest strawberry gardens in the whole district is that of Mr. Christie Volcker. The soil is a red loam of good depth, usually having a free subsoil, and, consequently, good drainage, and it produces very fine pineapples, both Smooth-leaf and Ripley Queens—the gardens of Messrs. Hugonin, Smith, and Smallman being noted for the quality of their fruit. Many kinds of strawberries have been tested in this part, and the most prolific and hardiest kind is undoubtedly the Glenfield Beauty; Annetta, Aurie, Captain, Edith, Federator, Trollop's, Royal Sovereign, and other kinds have been tried, and of these Trollop's is in the lead as an all-round berry. The garden at Ormiston House, the residence of the late Hon. L. Hope, has a number of interesting trees, amongst them the date palm, which has set perfect fruit when artificially fertilised, allspice, and several others.

Some 2 miles further on we come to Cleveland West, the business terminus of the line which is, however, continued along the shore of Raby Bay to Cleveland. Cleveland West is the station from which the whole of the produce that is sent by rail from Cleveland, Redland Bay, and Mount Cotton is shipped, and is the point from which the coach leaves for Redland Bay. A large quantity of fruit and vegetables of all kinds is shipped from this station, which presents a very busy scene during the height of the season when pines are coming in freely, and does a regular steady trade throughout the year, as there is always some crop or other, either of fruit or vegetables, ready for market. Like the rest of the district, the main cultivation is confined to the red soil ridges, though it is gradually spreading to the lower lands, some of which are found to be well suited to the growth of vegetables and strawberries, though unsuitable for pines or other crops that require perfect drainage and freedom from frost. A very wide range of fruit and vegetable products are grown, and fine exhibits of same are made at the annual show. Strawberries are planted extensively, and are grown in all kinds of soil, experience showing that certain

Plate XXVI.

1. Mr. Shapland's Pineapple Plantation, showing Tomatoes growing over Pines, Wellington Point.
2. Mr. Kefford's Pineapple Plantation and Residence, Wellington Point.

varieties are adapted to each class of soil. Thus, Trollop's Victoria, Annetta, and Aurie do best on the warm, well-drained red loams, and Federator on the colder and heavier soils; in fact, the best patch of Federators I have seen this year are grown by Mr. Peel in a drained tea-tree swamp. Mr. Peel, who is a trained Victorian gardener, resident some years in Queensland, was the first to take up strawberry-growing on a commercial scale in this district, and to make it a success, and his experience has been of considerable assistance to many of those who have gone in for the culture of this fruit. The growing of pineapples is making rapid progress, and there are a number of plantations scattered throughout the district, many of which are producing fine fruit, particularly of the Smooth-leaf and Ripley Queen varieties. Sugar bananas do well in good, well-drained soil, as also do papaws. Passion fruit does well, the fruit being of fine size and good quality. There are a number of old citrus and mango trees, the former looking well at present, though the mango crop is off this year throughout the district. Fig-growing for jam-making, citron culture for peel, also promise well. Tomatoes and cucumbers do well, and there is a fine show of the former this season, the fruit being shipped to the southern markets or sold locally for sauce or chutney making. Good asparagus is grown, though not to any large extent, and vegetables of all kinds thrive well; peas, beans, cabbages, turnips, &c., being very fine this season. There is a local horticultural society, the members of which take a keen interest in the advancement of the district, and, in addition to the holding of shows, there are meetings to discuss matters of interest to those who are making their living off the land.

Taking coach from Cleveland to Redland Bay, 8 miles, one passes through a number of Cleveland orchards—those of Messrs. Fox and Lewis, Cross, junr., Cross, senr., H. Heineman, and others showing up well from the road. After leaving the property of Mr. Cross, senr., poor country is passed through, and continues more or less all the way till Redland Bay is reached, though there is a fine fruit-growing district to the right, or bay side, of the road, at Victoria Point, that has been growng fine pineapples for years, and in which a considerable area of new land is being planted to this crop. The land is forest, soil red loam, generally with good drainage, and in parts inclined to sandy loam. Mr. Colburn, the pioneer of this part, has some 50 acres of land under pineapples, and Mr. Raff, who has recently taken up a considerable area of land, has already planted a large area, which he proposes to extend. Like Cleveland, the Smooth-leaf and Ripley Queen pines do best here; the plants are healthy and vigorous, and the fruit is of good quality. A few vines are also grown, but pineapple-growing is the main industry.

On reaching Redland Bay, the first thing to attract one's notice is that practically the whole of the available land is under cultivation from the shores of the bay as far back as the red loamy soils extend. There are a number of holdings, none of any very great area, each with a residence and requisite buildings, the whole making a very compact and prosperous settlement. The land was originally partly scrub and partly forest, the former being the richer of the two. The soil is a very deep, loose, friable one, that sticks to everything either dry or wet, and that on account of its porosity can stand plenty of rain without injury. It grows all kinds of fruit that the climate is suited for, and, as already stated in the beginning of this paper, has been noted for years for the excellence of its bananas. Northern competition, however, forced growers to reduce the area under this crop, with the result that much of the land has been planted to other fruits, the principal of which are pines, citrus fruits, passion fruit, and custard apples, though there are still a number of Cavendish bananas being set out.

Some of the best grown orange-trees in the State are to be seen here, and the patch of 100 old seedling trees at Mr. Hooper's, of which Fig. 1, Plate XXVII., shows a part of one row, is equal to anything, not only in this State, but in Australia. There are also a number of very fine trees at the orchards of

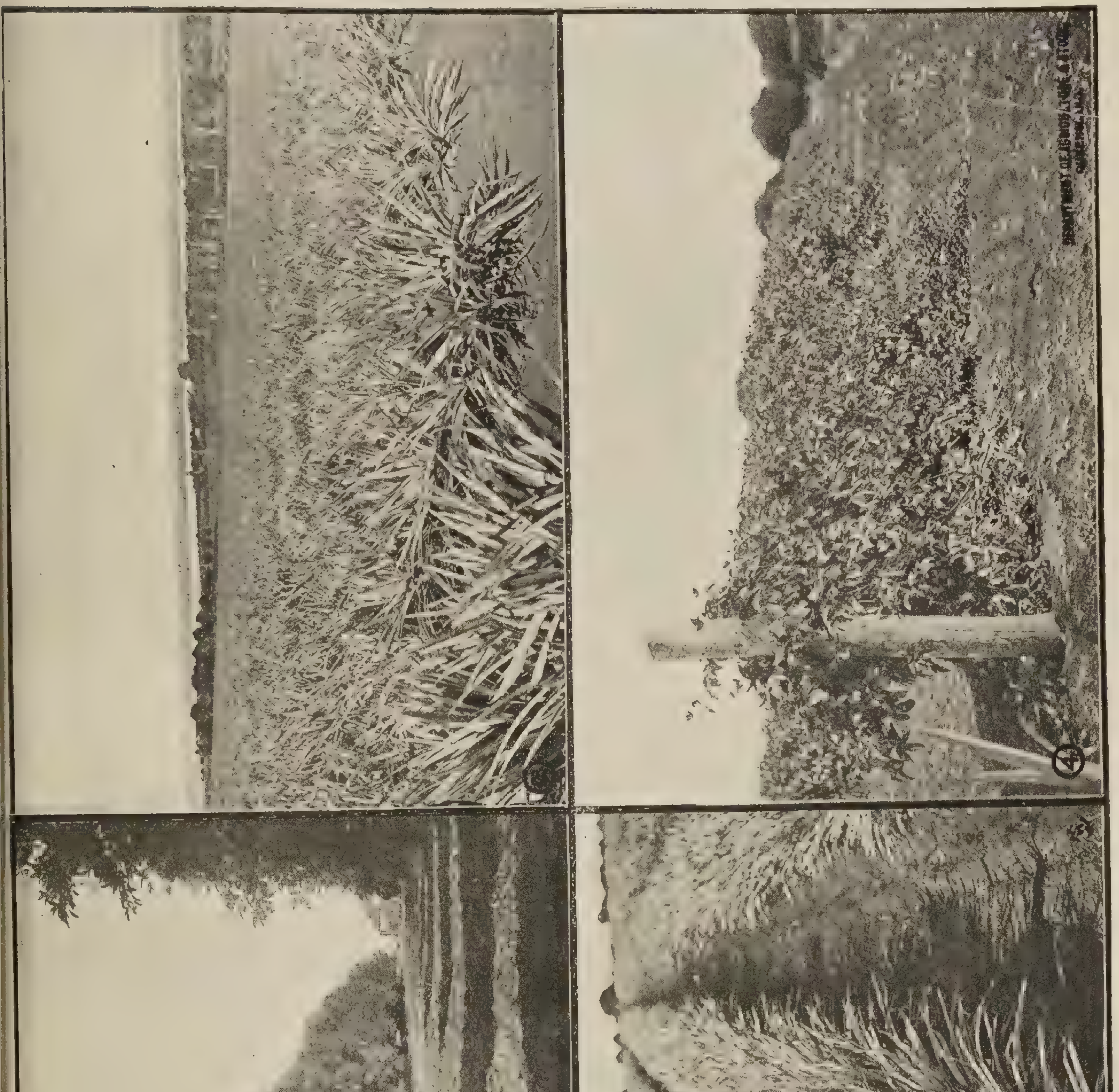
Messrs. Collins, senr. and junr., Day, Moore, and Meissner, and every care is taken to keep them in the best of condition and free from pests; cyaniding for the destruction of scale insects being systematically carried out. The quality of the citrus fruits is good, and there is a fine promise for the coming season. Pineapples, both Smooth and Ripley Queens, do well, especially on the forest land, as Figs. 2 and 3, Plate XXVII., views of the plantation of Mr. John Doig, clearly show; and the gardens of Mr. Melrose and others adjoining look equally as well. Thorough cultivation, systematic manuring, and careful attention result in the production of heavy crops of first-class quality, as instanced by the fact that the Redland Bay pines take prizes wherever shown. Mangoes grow to large trees and bear heavily, and passion fruit—Fig. 4, Plate XXVII., taken in Mr. Moore's orchard—shows how well this crop grows. There is one fruit in which Redland Bay excels—viz., the custard apple, of which there are many types, some of large size and exquisite flavour. Mr. L. G. Corrie has paid careful attention to the improvement in this fruit for some years, and now nothing but the best types are being propagated by grafting on to strong-growing seedling stocks, and many of the growers have a number of trees of the best kind now in bearing, from which they obtained good returns last season. Grapes do fairly well, also persimmons, and several other fruits and vegetables of different kinds as well as fodder for stock are also grown. The fruitgrowers of Redland Bay look after their orchards well, and the district is undoubtedly one of the show places of the State, and deserves more recognition from the public than it gets.

The last part of the district that I will deal with is that of Mount Cotton, some 4 miles to the west of Redland Bay. The country between the two places is of very poor quality, but at Mount Cotton there is some really good fruit-growing land. The greater portion of the eastern and southern slopes of the mountain was originally covered with scrub, and on this land cane was grown for many years. Now fruit-growing has complete control, and extends from the foot right to the top of the mountain. The soil is extremely variable, and, in parts, the land is very stoney and steep; still, even when covered with a complete covering of loose stones, it is growing fine citrus fruit. Pineapples—Rough or Common Queen, and Smooth-leaf—are grown in quantity, but the Ripley Queen is not a success. The orchards of Messrs. Haack, Holtzaepfel Bros., Heinemann, Benfer, and others produce large crops of pineapples, bananas, citrus fruits, mangoes, and passion fruit, as well as tomatoes, cucumbers, &c. Some of the pineapple plantations are of quite a respectable age, a portion of Mr. Harry Heinemann's having been in fruit considerably over twenty years, and is still looking vigorous, and producing fine fruit, despite the fact that it has never had 1 lb. of manure, thus showing how well the soil is suited to the growth of this crop. All fruits look well at the present time on the mountain, and, with the exception of mangoes, there is a promise of a heavy crop during the coming season. The bulk of the land suitable for fruit culture is under cultivation, and growers do their best to keep down pests of all kinds, though in some cases the broken nature of the ground renders such operations as cyaniding by no means an easy job. Wherever the drainage is good pines do well, but when it is otherwise they always turn out a failure. The illustrations accompanying this article are reproduced from photographs recently taken by Mr. Mobsby, the artist of this Department, and will show in a small measure the possibilities of this fine district.

FRUIT PESTS.

Amongst the many insect pests which are so injurious to fruit in this State there is one which is almost exclusively the enemy of the olive—*Mosca olearia.* The splendid olive-trees at St. Helena, in Moreton Bay, which bear very heavily, have of late been so severely attacked by this fly that there has practically been no crop available for any purpose but the manufacture

Plate XXVII.



1. Mr. Hooper's Seedling Oranges, Redland Bay.
2 and 3. Pineapples at Mr. John Doig's, Redland Bay.
4. Passion Vines on Trellis at Mr. Moore's, Redland Bay.

of a small quantity of oil. At a conference of the Association of Italian Agriculturists, Professor Berlèse gave an account of the results of a campaign undertaken against the fly, which it was attempted to destroy by means of an arsenical poison, and he added that his entomological researches had led him to the discovery of a hymenopterous insect which preyed upon the larvæ of the fly, and he attributed to this fortuitous auxiliary the abundant olive crop of 1905. The "Bulletin de l'Office," whence we derive this information, says that an Italian olive-grower, M. James Aguet, has addressed a most interesting letter on the subject to Professor Barlèse to the following effect:—

"We were very pleased to learn that the arsenical preparation used against the *Mosca olearia* not only absolutely destroyed that enemy of the olive, but had no appreciable injurious effect on other insects. Still, it would be well to obtain decisive evidence of its innocuousness for other insects, especially for bees. It does not follow that whilst the preparation is destructive of the fly it is harmless in the case of other insects such as the bee. Arsenic does not operate instantaneously, and if there are not any other dead insects found under the trees, that is no proof that it is innocuous in their case. It is quite possible that the bee may carry away to its hive a death-germ, and the same fate might overtake the legion of flies whose presence on the flowers powerfully assists fecundation.

It would not be a good thing if the agent only protected the olives at the cost of other plants growing in their neighbourhood. But since it has been demonstrated that the scourge of the olive-tree has an enemy which feeds on its unhatched eggs, would it not be preferable to devote oneself to the multiplication of these auxiliaries. In this manner an exclusively destructive agent would be obtained with the certainty that it would not injure useful insects. The hymenopterous insect in question must have some habitat, and, doubtless, a strict search would result in the discovery of sufficient numbers. This insect must have a mission to fulfil in the scheme of creation. In fact, it is a law of nature that all its elements are in perfect equilibrium.

Have we not had numberless proofs lately of this law, as, for instance, the importation from Spain of the fly which destroys the grub so dangerous to the apple blossom in the United States? We may also instance a ladybird of Australia (*Vedalia cardinalis*), the natural enemy of a very dangerous parasite of stone fruit. Nor should we forget to mention the success obtained against the *Depidosaphes Beckii*, inimical to orange-trees, and which is conquered by a Chinese insect brought from the Celestial Empire by an entomological mission. M. Aguet concludes that science has discovered in the insect destroyer of the larvæ of the *Mosca olearia* an agent all the more valuable as it will cost nothing, and will faithfully carry out the mission confided to it by Nature."

THE AUSTRALIAN RABBIT TRADE.

The "Fish Trades Gazette" gives the following particulars of the shipments of frozen rabbits from Australia, which are daily arriving in England:—

The following boats are just arrived or due:—The "Orotava" with 647 crates of rabbits, the "Paparoa" with 4,393 crates, and the "Oswestry Grange" with 20,651. The "Cufic," due 5th October, was reported from Sydney as having 10,793 crates on board (manifest incomplete). The "Geelong" is due 5th October with 8,358 crates of rabbits, and the "Afric" with 21,785 crates; total, 66,627 crates within the next 8 or 10 days.

In money value this represents a total of nearly £40,000 for less than a fortnight's operations. No wonder that rabbit trappers object to any wholesale and final destruction of bunny. Still, it is a question of beef and mutton and wool *versus* frozen rabbit, and we take it that the former are far more important products of Australasia than millions of rabbits.

Tropical Industries.

MAIZE IN TROPICAL QUEENSLAND.

[A Lecture delivered at the Annual Meeting, Atherton District Farmers' Association, Atherton, October, 1906.]

BY H. NEWPORT, Instructor in Tropical Agriculture.

The Government Statistician, in dealing with agricultural statistics in the annual report of my Department, makes the remark: "The largest yield per acre (of maize, throughout Queensland) was 37·75 bushels at Herberton district (*i.e.*, Atherton), followed by Cairns with 33·96 bushels," and accounts for this by adding: "the rich scrub lands of the Northern districts not yet having been depleted by unscientific farming." This seems a very back-handed sort of compliment, both to the district and the farmers in it, because it distinctly implies that depletion is inevitable, and by means of unscientific farming. Now, whatever may be said of the aliens growing maize in the district, and however their methods of culture may be criticised, I trust that this may never prove to be true of the white farmer. While the remark may be taken as a warning, there is a great deal that may be learnt from it. Let us see what foundation there is for the idea embodied—viz., that the most advantage is not being taken of the favourable climate and soil of these Northern lands. Taking 56 lb. as a bushel, and corn planted 3½ feet by 3½ feet apart, with two plants in each hole (it is frequently planted closer, and with three in a hole), this means that 7,112 plants or thereabouts are raised on every acre. Suppose each plant bore a cob, as it should, then the amount of corn on each cob is about ·29 of a lb., or a little over 4½ oz. of dry grain. Or, what is more probable, if the cobs average, say, 8 oz. each of grain (no unduly high average), then of the 7,112 plants only 4,228 bear cobs, and the rest, some 2,884 per acre, are deadheads.

This would indicate that there is a leakage somewhere—either your maize plants are not producing cobs or your cobs not producing the grains they ought to. In other words, it would seem that a lot of maize is being grown of very indifferent productivity, or plants grown which do not pay for their cultivation, let alone their fair share of the interest on the invested capital represented by the clearing of the land they occupy.

As for what is a fair and reasonable crop, I would refer to the same report I have quoted from—page 79—the report of experimental planting and cultivation of maize by Mr. Martin on the Hermitage State Farm.

In the matter of climate and soil, the Atherton district need give nothing to that of the Hermitage.

Taking No. 1 plot there—two grains, check sown, 4 feet apart, and without after-cultivation, a yield of 48·5 bushels per acre was obtained. This represents 5,444 plants per acre, and at the same weight of 56 lb. per bushel equals, as nearly as possible, 8 oz. per cob; and you will note that with one exception out of ten plots this was the lowest, the average exceeding this by nearly 10 bushels, representing, roughly, 1½ oz. more per cob.

In America, in experimental fields, by selection of seed and with frequent and light cultivation, the averages run from the 80's to 90's, and even 100 bushels per acre is not uncommon.

It must be admitted, therefore, that, although Atherton scrub lands lead in the average returns per acre, there is ample room for improvement. By what methods can this be obtained? By attention to: (1) Mechanical condition of soil before planting; (2) Attention to the operation of planting; (3) Selection of seed with judgment and care; (4) Cultivation after planting.

Mechanical Condition of the Soil: Maize is a coarse feeder, requiring plenty of moisture and nitrogen-carrying humus in the soil. A maize plant is said to utilise 300 lb. of moisture to make 1 lb. of dry matter.

Where cleared land is used, ploughing, disking, and harrowing in good time are of immense advantage, and are, I must say, generally done. Generally speaking, deep ploughing and subsoiling are of little advantage; 4 to 5 inches is really enough, but that should be in a good condition of tilth to obtain the best results. The preparation of the soil—that is, the preliminary field work—depends on the rains, and varies with the soil, climate, and locality.

With stumps and logs present in the field, as is most often the case in the Atherton maize fields, and unavoidable during the first few years after clearing, horse work is, of course, out of the question, but, as a compensation, the soil is not packed so closely as later, and more humus is present in the decaying roots and rootlets, so that the mechanical condition is fairly favourable. The burning off of scrub is to be regretted, on account of the loss of humus it involves, but is unavoidable. I would only suggest the spreading of the heaps of wood ashes, often found a foot or so deep where some monster log has been burnt.

In planting, careful tests have been made with broadcasting, drilling, planting by hand in holes, and check-planting in furrows. The method in vogue here is planting in holes with a hoe, against which there is little to be said. With regard to distances apart of the plants, the best results all round have been obtained at 3½ by 3½ feet, with two plants in each spot; greater distances with more plants in each hole have been found to give no advantage in returns; and closer planting does not give the plants room to develop, and involves a greater percentage of barren stalks. The thought that by planting closer more will be reaped is a fallacy. I have seen several fields so planted in this district, and possibly this is to some extent the cause of the high percentage of barren plants per acre; 4 feet is about the farthest, and 3½ feet the nearest, distance commensurate with the most profitable returns. Hilling up maize has also been found to show so little advantage in returns as to be generally abandoned now. It is a mistake to suppose that because roots are apparent at the base of the plant that they should be covered. Maize being essentially a surface feeder, nothing is gained by burying the roots to a greater depth; it has rather a tendency to render them incapable of performing their function in the collection of moisture and food for the plant, and possibly killing them off, and necessitating the growth of a new series of roots at the depth from the surface that Nature wants them. Besides this, hilling presents a greater surface, both to keep clean and for the evaporation of moisture.

In sowing the seed, it should be borne in mind that the more perfect the bed the better, not only for percentage of germination, but for the subsequent robustness of the plant. All seedlings have a critical period to pass through when the food in the seed has been exhausted, or nearly so, and the roots are just commencing to exercise their functions in obtaining it from the soil for the plant. More plants are rendered weakly, poor, or incapable of bearing healthy and even normal crops by a check at this time than at any other. Care and attention to setting the seed are, therefore, well worth while. The mere broadcasting of more seed because it may be cheap, and trusting to Nature to undertake her own selection by means of survival of the fittest, does not meet the case at all. Sometimes the hardiest plants produce a poor quality of grain, and the really prolific ones, not only in quantity but in quality, require, as well as repay, a little extra attention.

As perfect a seed bed as possible in every instance is required, and it is often possible to do this more thoroughly when planting with the hoe and hand than when dealing with a whole field by means of implements and horses. The seed bed should ensure moisture, warmth, and air for the seed to germinate satisfactorily, and a finely broken up and firmly pressed, but not

hard, condition of the soil, to afford encouragement and not discouragement to the rootlets when they first appear. A depth of 2 inches has been found deep enough to plant. There is, I think, a tendency to plant too deeply with the hoe, which should be guarded against.

The first roots of the seedling appear only at an average depth of half an inch. After this, they have a downward tendency until the plant is 2 to 3 feet high, by which time the ground 4 inches or so below the surface is a network of rootlets. With so shallow an average depth at which the roots lie, it is obvious that only the shallowest cultivation is possible without disturbing these roots. It is said that, generally speaking, there is enough moisture in the ground at the time of sowing maize to last until its maturity if only it could be properly or entirely conserved. The light cultivation to create the loose surface mulch which, in breaking the continuity of the capillary tubes, is going to prevent evaporation should be undertaken before signs of dry weather set in. To trust to showers, and think that at the last minute, when drought is inevitable, creating the loose mulch will save the situation, is mending the gap in your fence when nearly all your stock have gone. The capillary tubes that are so often quoted, and which are such a simple idea and so obvious when illustrated by glass tubes, &c., are not, it must be remembered, like so many leaden pipes, that once the top is twisted will remain so for the rest of the season, but are, if not actually living things, in a constant state of forming, changing, and reforming. Once the continuity is broken, the moisture they are bringing up is arrested, but only temporarily. The tubes start to form again almost at once. A once loosened surface is good, twice-worked better, but it takes a many times scuffled surface to make the arrest of the valuable moisture as complete as possible, satisfactory, and effective.

The necessity of cultivating does not depend upon the growth of weeds. If weeds are there, you may rest assured you are losing both moisture and plant food, not only where they are growing, but where they are not. Cultivation should not merely be done because there are weeds, or, worse still, omitted because weeds do not happen to be in evidence. The object of cultivation is threefold—to conserve moisture, remove the weeds, and aerate the soil. Soil cakes very quickly after even a slight shower of rain, or even with only dew and wind. I have seen soils that looked in perfect tilth on the surface from which, nevertheless, with a little manipulation, it was possible to lift up a crust some inches square. This crust is what should be broken up. The Atherton soils are very liable to cake on the surface in this manner. This cultivating or scuffling is cheaper when effected by horse power, but this is not always feasible. Hand-hoeing, though more expensive, has been proved to be more effective. Beyond the removal of weeds, no cultivation is necessary or advisable within 6 inches of the stem of the plants. If earth comes away with the weeds within this radius, a similar quantity should be put back, but the plant should not be hilled up.

The varieties of maize, seed of which is now advertised for sale, are legion. Some of the principal types of American maize are the Leaming. This was named after a farmer who was one of the first to practically improve maize by selection of seed. The original maize from which this, which is now recognised as a type, was evolved was a small, weedy cob, thick in the butt, tapering, with bald tip and butt—everything that a cob should not be. It is an indication of what can be done by simple selection on the farm and by the farmer. There are many varieties now of the "Leaming" maizes, of which the Starr Leaming is perhaps the best, and seed of which is obtainable from the Department. Riley is another favourite American maize, of which there are a number of varieties, as are also "Golden" maizes. The Yellow Dent is an old, well-tried variety that will retain its type well. The variety at Atherton is very similar, and would appear to be what is known as a Yellow Horse Tooth, but has hybridised very much with other varieties. The Red

Jamaica is a good variety for dry situations and seasons. Argentine maize has a small kernel, but is a heavy bearer, and is said also to be a good dry climate maize. Peruvian or Cuzco maize is a large variety, but probably would do better for cornflour-making than for the ordinary feeding purposes.

The average yield of maize throughout America is about 30 bushels per acre, while Queensland is only about 20, and, as the soils and climate are certainly no worse, the difference must be put down to indifferent cultivation. I am of opinion that it may be largely accounted for by the apathy displayed in the matter of selection of seed. The greatest care is exercised in the matter of selection of stock, &c., for propagational purposes, for the results of which one has to wait years, but in a staple in which the results would be almost immediately apparent the average farmer "can't be bothered," which is most inconsistent as well as shortsighted.

Maize should be stored as long as possible in the cob, the core of which is absorbent and aids in the effective maturity of the grain. The utilisation of maize stover has been given very little attention in this district. Hitherto, perhaps, there has not seemed much necessity, but with the advent of dairy cattle the matter is worthy of attention.

In India it is the general custom to sow one and sometimes two other crops with maize; the first is harvested within a few weeks of the maize, and the other frequently fed off, when the stock also eat down the maize stalks. Pigeon pea (*Cajanus indica*) is one of the crops often sown there with maize. There is a sale for these peas as a food and fodder there; but the plant is also a good green fodder, and at the same time it is a rich nitrogen-catching crop, and would materially improve the soils. The sowing of cow peas, rape, and such things, so that they come on after the harvesting of maize, would utilise to the full the cultivation already accorded the maize on the one hand, and largely choke off the weed growth so generally seen about this season, and which so frequently is allowed to shed its seed again for the next year. If such crops were harvested for the silo, the presence of the maize stalks would in no way reduce their value as silage.

The matter of seed selection and improvement is, I think, the most important of any. Few plants hybridise so readily as maize, and plants having these characteristics also generally deteriorate equally quickly. Pollination in maize is generally effected by wind, and the wind will carry the pollen 100 yards or more. The fact of this probability of cross-fertilisation should be borne in mind in the selection of seed. The first place that the selection of maize for seed should take place is in the field, and not in the barn, as is most general. The collection of cobs for seed should be done at the time of harvesting, and from that time they should be kept distinct and be separately treated. The finest patch of land in the field should not be chosen, nor should the worst, though, generally speaking, the corn that produces the best returns under the less favourable conditions is better for seed purposes. Once a plot is decided upon, the deadheads or non-cobbing plants should be pulled out or cut down, because, though not bearing cobs, they still bear pollen and fructify other grains which inherit the tendency. The plants should then be judged as well as the cobs, and the cobs as well as the grains or kernels. The plant should be of medium height and size, neither too thick nor too weedy, and should stand up well, bearing its cob at a convenient height. The cob for seed should be long, well-developed, and cylindrical or nearly so. Too great in circumference generally means kernels of weak vitality. The rows of kernels should be straight and close, the tips and butts of the cobs well covered, and the kernels rather deeply dented. Cobs for seed should be rather more rough than ordinary, for, otherwise, having a natural tendency to revert, the general crop is apt to get smoother and shallower in grain season by season. The good old fashion of hanging seed maize by the sheath is difficult to beat; a good way is to have a number of nails with pointed heads in a portion of the barn wall and stick the seed cobs on to them by the butt, but they should not

be touching each other. When stripped for using, only the middle portion of the cob should be used, and the flinty, deep kernels selected. It always pays to test the germination of seed, whether of maize or any other grains, and it is easily done between pads of damp cloth or old felt, or even in damp soil or sand; in the latter case, it must be kept warm, and yet evaporation of the moisture prevented. A given number of grains should be counted out. A lot may be learnt from this simple method of testing, which only takes a few days to determine. Not only is the percentage of germination ascertained, but the comparative vitality and the variations in vitality, if noted carefully, will probably be astonishing to many of you. Now, I do not want you to think from the foregoing that I am advocating the farmers going into the intricacies of plant improvement, artificial hybridisation, and the creation of new types. The average farmer has not time for this, and it is not his work; but the maintaining of the standard will be found well within the scope of all, and is a job on the farm that gives bigger wages for the time occupied than almost any other, and which, therefore, should never be neglected.

A great diversity of opinion exists as to what the standard of a cob of corn is, and the points to be looked for and perpetuated by selection, &c.—in short, what a corn cob should be, and we should, therefore, aim to produce. Now, the standard of different varieties differs much, not only in colour and size, but in shape of cob and kernel. In obtaining new seed, therefore, some points regarding the standard of that type should be at the same time obtained, so as to know what points to perpetuate. Too often seed maize is judged by the kernel only, and the purchaser does not stop to inquire whether the cobs will give him 3 oz. of grain or 12, nor whether the plants are strong-growing and hardy, or the vitality of the seed is good. So it often pays better to collect your own seed and be sure of all these points than pay a long price to someone else for a fancy seed, especially without particulars. Again, with the great tendency of maize to revert, the especial points of a newly imported seed are soon lost and the standard reduced to the average of the farm unless special care is exercised by selection to maintain the standard.

The first point to look for in maize cobs is *uniformity*, both in size, shape, colour, and indentation, and the regularity and straightness of the rows of kernels. This first general point gives an indication of not merely the care exercised in selection, but of the care shown in cultivation. The next is the *shape of the ears*. These should be cylindrical, or as nearly so as possible. The excessively tapering cobs should be avoided, and especially the heavy and bulging butts and the scraggy, long-drawn-out tips. Both tips and butts should be nicely moulded, and neither too sharp nor too blunt, but rather more blunt than the average at present in this district. *Colour of ears:* This, of course, depends on the type. Of Leamings, Rileys, Dents, and all Golden maizes, the colour should be a good, uniform, light-golden yellow. The dented kernels are always a little lighter in colour than those at the tip and butt, which have no indentation, but the contrast should not be marked. The white tip to the kernel of a Golden maize is a sign of cross-fertilisation. There is a strain of Jamaica Red maize in the district, which has cross-fertilised with the yellow maize to such an extent that traces can be found of it in almost every other cob picked up. Red maize should show a red core, and white or yellow maize a white core. *Market condition:* This is a point for maize in shows; but, when judging one's own at home, it should always be in marketable condition—*i.e.*, properly matured and dried. Its marketableness is one of the most important points, and includes the weight per measure—*i.e.*, weight per bushel; or, for ease of calculation, weight (thoroughly dry) per pint—1/64th of a bushel. Next, *tips of the ears:* These should be, as above stated, symmetrical and rather blunt, and well covered with grains. The bald tip should be eliminated as far as possible, and would certainly lose points in judging. The *butts of the ears* should have kernels swelled out evenly round the shank. Of course, less grains will be found at both tip and butt,

and the grains themselves, having more space to cover, will flatten out and show little or no indentation. This also happens whenever a miss occurs in the pollination and setting of the grains in the regular rows on the middle of the cob.

The next point is

Uniformity of Kernels,

in colour, size, shape, depth, and uniformity. In judging this point, some grains must be removed from the cob, about the centre of it by preference. You will find many cobs having narrow, very closely fitting grains in the centre, which very quickly begin to increase in depth and thickness away from the centre. The kernels should be as uniform as possible throughout the greater part of the cob. *Shape of kernels:* These should be wedge-shape or "horse-toothed," as is the more common term. The dentation should be regular and not too deep. Generally speaking, fairly deeply dented grains are long and heavy ones, but too deeply dented are apt to be chaffy. The smooth kernels, on the other hand, are usually shallow. On cutting kernels in half across, they should be found of uniform and fair thickness, and the hard, flinty, yellow portion in due proportion to the soft flowery part. Roughly, the hard flinty matter indicates the food value containing the proteim, the flowery part indicating the starch, and the size of the germ giving an indication of the oil content. The *space between the rows of kernels* in the cob should be carefully noticed and judged. No space on the cob should be lost by the rows being wide apart, and the rows should lie quite close together. The *length of the cobs* will vary with the type to some extent; but, as a general average and as a standard, 10 to 11 inches may be looked for. A very long cob, as is often seen, though gaining points on this, will often be found on close examination to lose more in other directions. A fair average is best, and especially a proportionate length. Certainly other good points should not be sacrificed for length. *Circumference:* This should be taken into consideration at the same time as length; a fair average circumference is 7 to 8 inches, or two-thirds of the length taken about three-fourths of the way down the cob from the tip, some 2½ inches from the butt end. Too small a circumference means less grains, but unproportionately large generally means shallow grains. The size of the core should be proportionate, and bear about a 20 per cent. relation by weight (dry) to the whole cob. When Mr. A. H. Benson and I were judging the corn cobs at the last Agricultural, Pastoral, and Mining Association Show, attention was drawn, in some very creditable exhibits, to the unduly large core, and I have since been asked how this could be remedied. I would answer—By selection of seed. But it must be remembered that the core is only too large when it is disproportionate; and I would suggest efforts being directed rather to the breeding of strains with more and deeper grains on the cores than merely smaller cores. In other words, it is not the size of the cores that need worry you, but rather the number and depth of the grains on it; and this is a matter well worthy of a little trouble, and which can be readily remedied, and much more easily than is thought. The last point is

Percentage of Corn on the Cob.

It is necessary that the cobs should be dry, of course, which in up-country shows they frequently are not. To obtain the per cent. of corn, one cob is shelled, and the weight of the shelled cob divided by the total weight of the whole cob. Eighty-eight per cent. is spoken of in America as a standard, but I am afraid would be seldom reached here.

I would recommend to your attention the score card used by the Illinois Corn Growers' Association, and from which I have taken the tabulation of the above points of a corn cob. This gives the score points as follows:—Uniformity 10, shape of ears 5, colour of ears 10, market condition 5, tips of ears 10, butts of ears 5, uniformity of kernels 5, space between rows of kernels 10, shape of

kernels 5, length of cob 10, circumference 5, and per cent. corn 20; total 100 points.

Now, at the annual show of the Agricultural, Pastoral, and Mining Association, it is often the case that the small farmer who has good corn will not send in an exhibit because he does not happen to have any cabbages, cauliflowers, or beetroots, &c., to send in at the same time to make up a general farm exhibit, and also so many various things have to be judged that it is not then possible to give the attention to each that it deserves. With maize, the staple crop of the district, the farmers should see to it that the prizes are worthy, proportionate to its importance, and sufficient to induce competition. I would suggest that the farmers' association could very well take this up, and hold a small maize and corn cob exhibition of its own in the season. It would be very little trouble for each farmer to bring a few cobs to some meeting, and if carefully judged by points, and each exhibit have a score card affixed, it would show how and why any one corn was recommended. It would, no doubt, be great satisfaction and most interesting to learn that one's corn was better than one's neighbours, but really more advantageous to learn it was not what it ought to be and could be (provided only that the exhibitor at the same time learnt why and how), because then he would be shown how he could increase his returns, and probably without increasing (possibly considerably decreasing) his expenses of cultivation. The results of such a competition might then be brought forward at the annual Agricultural, Pastoral, and Mining Show. If the farmers' association would take this matter up, and others similarly, it would be doing useful and lasting work. It would be found both interesting and instructive, would induce and maintain the interest of the members, and I am sure the association would find itself the centre of interest in the country as well as influential and strong in membership.

NEW LINEN PLANT THAT GROWS IN BRAZIL.

BRITISH ENTERPISE.

The American Consul-General at Rio de Janeiro has submitted a report to the Washington Department of Commerce on the plant known as "Brazilian linen," which he thinks may revolutionise the linen industry of the world.

The new plant, which is indigenous to Brazil and some of the great fertile plains of South America, is technically described as *Canhamo braziliensis Perini*, being named after its discoverer, Dr. Victorio Antonio de Perini, and its practical development is now being effected upon several experimental plantations, the most notable of which is at Boa Vista, in the State of Rio de Janeiro. The development was commenced with the assistance of the State Government, and has continued to a point where it may be stated without fear of question, according to the report, that the fibre is a success, and that its influence will be felt at once in the fabric world. The product of the plantations now established has been contracted for by British interests at a very profitable rate. One of the plantations established includes an area of 500,000 square metres of the growing plants at Radeiro, and the one at Boa Vista will soon contain over 2,000,000 square metres.

The *Canhamo braziliensis Perini* is virtually a weed, growing from 12 to 18 feet high in 4 or 5 months, resembling in general appearance the hemp. The special advantages of this Brazilian fibre over European linen and other similar plants claimed by those interested in its cultivation are:—

(1) It is absolutely hardy, resisting alike the dry or the rainy season, bearing equally well in dry or wet soil, and not a prey to insects or mildew.

(2) No care or special cultivation is required after planting.

(3) The plant matures so rapidly that a crop can be gathered 3 months after sowing—that is, three crops a year can be had.

(4) Its general nature is such and the qualities above enumerated are such that it can be grown upon what are now vast tracts of practically waste land, with comparatively little outlay of capital.

(5) The fibre has all the necessary qualities required for high-class use—viz., strength, fineness, flexibility, and adaptability for bleaching or dyeing.

(6) Every portion of the plant can be used for some industrial purpose.

A Long Strong Fibre.

The discoverer and the Brazilian interests claim that they can produce a fibre equal to the best European linen, and that this plant can be grown under such conditions that the production of this fibre will be cheaper and greater than that possible with the European article. The results of the initial work demonstrate vast possibilities in the plant which have not yet been developed. The samples of fibre transmitted to the Bureau of Manufactures for inspection by American textile manufacturers were taken from a plant growing wild. The cultivated product shows a finer fibre with strands of greater length, being much longer than European linen or hemp. In fact, it is so long that it must be cut before being used for weaving purposes. As to its strength, the following results of repeated and careful experiments made with threads of equal thickness will prove interesting: Linen broke when the weight attached reached 7 kilos (kilo = 2·2 lb.); European hemp broke when the weight attached reached 10 kilos; *Canhamo braziliensis* fibre A broke when weight attached reached 9 kilos; fibre B broke at 10 kilos, and fibre C broke at 12 kilos.

The growers of the plant claim that every particle of it can be used for valuable purposes. The fibre runs generally into three grades, the finest of which corresponds to the best linen, the second to coarse linen, and the third to European hemp. From the fibre of the plant, therefore, come both fine linen and strong rope. The residue of the plant is composed of high-grade cellulose, said to be especially suitable for the manufacture of fine writing paper, the whiteness and clearness of the stem of the plant simplifying the process of manufacture. The fibre is adapted to dyeing and bleaching. The dyed samples have a lustre and silky appearance.

The present cultivation of the *Canhamo braziliensis Perini* is largely experimental, but the best time for planting is found to be in November, corresponding to May in the Northern Hemisphere, although planting can be done at any time of the year in this Brazilian tropical climate. The ground is prepared in September (March) to October (April) in two divisions, a comparatively small space for growing seed and the rest for industrial purposes. The seed-crop ground should be prepared earlier, if possible, and be sown with 25 seeds to the square metre (39·37 inches), thus giving the plant more room to grow than is allowed for fibre, which needs 100 seeds to the square metre, this number of seeds generally weighing about 2 grammes. Thus closely planted, the stalks grow with but one stem, not having space to branch out. The fibre thus produced is finer and more silky.

Harvesting Results.

The plants grown for fibre should be cut before flowering; in the experimental grounds they require about 3 months to attain the proper growth of 3 metres, or about 10 feet. The staple is quite long, as compared with the 40 to 50 millimetres of flax and 1·30 to 1·50 metres of hemp. The plants are cut about 4 inches above the ground. They will immediately send out shoots, which can be cut in the same manner, again forcing a new growth. In this manner there will be a harvest, from plants sown in November, in February, June, and October, corresponding to August, December, and April in the Northern Hemisphere. After the last harvest, it is necessary to dig up the roots and prepare the land for a new sowing. Where the plants are grown for seed a 4-months'

growth is required, which is cut, and the stalks brought to a second flowering, which is allowed to dry on the plants. The fibre is coarser than that grown for fibre alone. It has been found necessary to keep the growing crop clean of weeds. The amount of fibre produced varies with the several crops. The results of the practical experiments of the "fazendas" are as follows:—

First Crop (on 100 Square Metres).

	Lb.
Clean fibre, unprepared in any way	440
Coarser fibre, unprepared in any way	350
Refuse from the mascerating tanks	400
Fibrous root and waste	155
Stems (for paper)	1,320

This was a seed crop, and to the above must be added 310 lb. of clean seed and 640 lb. of seed with the shell on.

Second Crop.

	Lb.
Clean fibre	270
Coarser	1,780
Fibrous roots	1,780

The average of the third crop is about one-half of the second crop. The annual production of 100 square metres planted with *Canhamo braziliensis*, therefore, is probably about 845 lb. of fine fibre, 3,020 lb. of coarser fibre, with something like 5,000 lb. of fibrous roots and waste suitable for paper manufacture. Multiplying these figures by 40 will give the annual production per acre, assuming that the production can be maintained in larger fields. An acre would thus produce 154,600 lb. of fibre of two grades—about 77 tons—for which, for the present at least, the promoters have a contract to dispose of all at £40 or 200 dollars gold per ton. This earning of 15,400 dollars an acre is based upon a local price of about 15 cents gold per lb. for the first grade, and 7 cents gold per lb. for the second grade fibre. It is a little difficult to believe these figures, but the experiments so far seem to speak for themselves.

FINE PAPER FROM WASTE—AMERICAN PATENTS.

The demand for the waste material of this plant for paper-making will be steady. At present all but coarse wrapping paper is imported, and the imports will exceed 3,300,000 dollars annually. White paper is not made in Brazil, owing to a lack of suitable material. So far, most of the planting of the *Canhamo braziliensis Perini* has been for seed, the promoters extending their plantings as rapidly as ground could be secured, cleared, and seed produced for the planting. Machinery for the treatment of the plant for the extraction of the fibre has been imported from Europe—the ploughs, reapers, and similar machinery, and pumps, and hydraulic machinery coming from England, while the crushing, combing, and other machinery came from Belfast, although constructed on Belgian models. Present plans contemplate only the production of the raw fibre for export, although the ultimate result may be a great manufacturing enterprise when labour and commercial conditions in Brazil will justify the venture.

The production of fibre from the *Canhamo braziliensis Perini* has just been patented in the United States. Whether the plant can be grown to advantage in the southern portion and Pacific coast regions of America free from frost is not known.

WILL EXPECTATIONS BE REALISED?

The Consul-General is "reasonably certain that the plant will have an important influence upon the textile world. Experiments to acclimatise flax and hemp in South America and Australia have uniformly failed, the efforts of several European authorities in Argentina, Chile, Venezuela, and Uruguay having no advantageous results, while those of the Irish Association of Belfast in Australia seem to have produced no effective results. The cultivation of flax in North America generally seems to have been almost abandoned as unprofitable, and, in spite of heroic efforts to maintain the linen-producing industry in India, the acreage was reduced several years ago to about 34,000 acres. It seems reasonable, therefore, to concede the claims of the Brazilian authorities that none but an indigenous plant which can be produced at a minimum cost in labour, soil, climate, and conditions of manufacture will be a success on American soil. They claim that they now have such a plant, and are pinning their faith to it and investing money in its development."

The Department of Commerce in publishing the report remarks that the Consul-General is in error in assuming that the cultivation of flax in North America has been "almost abandoned as unprofitable." There were 2,534,830 acres under cultivation in the United States in 1905, an increase of 271,271 acres over the previous year. The farm value of the crop on 1st December was £4,808,814. It is cultivated chiefly for the seed.—"Commercial Intelligence."

[To this we would add that the Consul-General is also in error in stating that flax-growing has proved a failure in Australia. The industry is, on the contrary, a great success. Amongst other growers, Messrs. Woolfe Bros., of Traralgon, Gippsland, Victoria, have every year large areas, totalling several hundred acres, under this crop, which yields a return of £16 per acre or £7 per acre profit.—ED. "Q.A.J."]

COTTON-GROWING.

The expansion of cotton-growing in the United States in the past has been due to the demand made by English and Continental mills. Of late, however, it has mainly been the result of the enormous demand for home consumption, the result of the multiplication of cotton mills in the United States, until to-day there are over 1,000 mills in the country consuming over 3,550,000 bales of cotton per annum, as against 3,500,000 bales representing the consumption on the part of Great Britain. Every year the number of these mills is being added to, and their capacity increased. The estimated number of spindles working in the Northern States has been set down at 14,150,000, and in the Southern States at 3,950,000. In Great Britain the number of working spindles is about 45,500,000, and in the Continental mills 32,500,000. This rapidly approaching supersession of the United Kingdom by the United States as the chief manufacturing country of the world is a fact of great importance, and one which will not be without its effect upon the production and transportation of cotton in America.

The area under cotton in the latter country amounts roughly to 25,000,000 acres, the chief development being in the State of Texas, and the chief reduction in area in Louisiana and Florida. Of an annual average crop of 11,000,000 bales, about 65 per cent. is exported, whilst the world's consumption reaches about 12,000,000 bales of 500 lb. each.

The recent disastrous cyclones in the United States have resulted in a very serious diminution of the crop for 1906, and it would be well for Queensland farmers to strain every nerve to profit by this shortage, as is being done by planters in the West Indies. As showing the steady growth of cotton-planting in these islands, it is stated by Sir Daniel Morris, K.C.M.G., &c., Imperial Commissioner for the West Indies, that in 1902 the value of the lint

and seed was just under £10,000; in 1903, the value was £12,000; in 1904, £32,000; and in 1905 it had risen to £63,000. Although the returns for 1906 are not yet completed, yet, as the value of the lint and seed produced during the quarter ending 31st March was nearly £42,000, the total value of the industry to date may be placed at £160,000. The West Indian cotton is principally Sea Island, and on 10th July, 1906, the Liverpool cotton brokers, Messrs. Wolstenholm and Holland, reported good business at from 12d. per lb. to 17d. per lb., and for a few bales of superfine cotton 17d. to 20d. per lb. Sea Island cotton thrives well all along the Queensland coast, and it seems a most extraordinary thing that, with every probability of these high prices being maintained, the farmers of this State do little to once more establish this paying industry both on the coast and inland.

NEW FIBRE PLANT—THE ZAPUPE.

We are indebted to the courtesy of Mr. W. B. Murray, editor and manager of the "Mexican Investor," for the following particulars concerning a very valuable fibre plant which is indigenous in the Mexican State of Tamaulipas:—

Marked interest has been developed in Mexico during the last year in the hitherto unappreciated fibre produced by the zapupe plant, which has been employed by the Indians for centuries in the manufacture of various articles, such as rope, bags, lariats, bridles, cordage, and seines. The zapupe fibre possesses many advantages over other similar fibres, and its pronounced merit as a commercial article will inevitably render it a source of great wealth to Mexico, where it appears to be indigenous. A tract of land exclusively devoted to its culture and for experimental purposes is now in full bearing, and the results obtained have surpassed the most sanguine expectations.

The zapupe is quite similar in appearance to the henequen plant of Yucatan. The leaves, however, are not so fleshy, and are longer. Leaf for leaf, it produces slightly less fibre than the henequen, but the total yield of fibre is greater, owing to the fact that there are double the number of leaves on the zapupe plant, which will yield seventy-five to eighty leaves. Its fibre is white when properly extracted, resistant, and flexible.

Rope made from it does not kink or mildew when exposed to dampness or immersion in water, and will freely run through ship blocks and pulleys, in which respect much difficulty and annoyance have been experienced with inferior fibre. Zapupe will yield the first cutting of leaves three years from the time the young scions are planted, and has a great advantage in this respect over other fibre-producing plants, which, as a rule, attain their period of production in five to seven years. From the first to the third year after beginning to yield it will produce 100 to 110 leaves annually, gradually decreasing to between seventy-five and eighty leaves, and retaining that production consecutively for 15 years. The fibre extracted will, on an average, be from 2½ to 3 lb. annually for each plant, although in exceptional cases, where the plants have been given special attention, they have produced as high as 4 lb. The leaves may be harvested throughout the year, from twenty to twenty-five leaves being cut every ninety days. If the leaves are not cut regularly, the life of the plant will be materially shortened—at the end of 5 to 7 years it will throw up from the centre a long stem about 8 feet high, and will shortly thereafter cease producing leaves and die. If the leaves are constantly cut, this does not occur until the fifteenth year, and frequently not until the eighteenth year. Branches develop from the summit of the stem, and in time become diminutive zapupe plants, which eventually become detached and are scattered over the ground, where they take root and become strong, vigorous plants. This stem produces from 2,000 to 2,500 of these tiny scions; in addition to this, numerous scions spring from the roots of the stump.

The plant requires but little attention. After the land has been cleared and scions planted, $6\frac{1}{2}$ by $6\frac{1}{2}$ feet apart each way, which permits 1,000 to be planted to an acre, it is necessary only to keep the young plants free from weeds. After the second year little or no cultivation is required, as their shade will check all undergrowth which might be injurious to them. Where vegetation is very rank it may be necessary to give the land a light cleaning once a year to permit labourers to pass freely from plant to plant to cut the leaves. This is a very simple operation, as the labourers are supplied with a long-bladed knife, having a sharp hook-like curve at the end, which is introduced between the stump and the leaf, and with a dexterous upper jerk the leaf is cut off close to the stump. This is essential, as an uneven, ragged stump will deteriorate and often die. After the required number of leaves are gathered and assembled in lots of 50, the long needle-like apexes are cut off and the leaves made up in bundles, tied, and carried to the cleaning-shed, situated so as to be within convenient reach of the plants. The machinery is either of the old plain type, with a capacity of cleaning 3,000 leaves in ten hours, or of the recent modern type, with a capacity of 100,000 leaves in ten hours. The leaves are fed at the receiving table of the machine, and the perfectly cleaned fibre is delivered at the outlet as fast as one man can handle it. The plain machines cost 300 dollars (£60) to 500 dollars (£100) gold, and the large automatic machines from 2,000 dollars (£400) to 3,000 dollars (£600) gold.

A plant one year old will produce fibre within two years. The present cost of such a plant is 3 cents; smaller plants may be had for $1\frac{1}{2}$ cents ($\frac{3}{4}$d.) apiece. With the cost of labour but 50 cents (2s. 1d.) a day, and the labourer boarding himself, it is estimated that the cost of producing 1 lb. of fibre is from 2 cents (1d.) to $2\frac{1}{2}$ cents ($1\frac{1}{4}$d.) a lb., delivered on board. As samples have been recently submitted to fibre experts in New York City, who estimated that the price would range from 8 cents (4d.) to 9 cents ($4\frac{1}{2}$d.) gold, equal to from £37 to £41 13s. per ton, it is evident that, after deducting cost of production, a very handsome profit would be realised.

As the plants approach their final leaf production, care is taken to plant young scions between the rows of old plants, so that they will reach maturity as the others die out. The plant is extremely vigorous, as the scions can be removed from the ground, allowed to remain under cover for weeks without the least care, and, when planted, will grow vigorously and suffer no evil effects. The zapupe will thrive in almost any location, and apparently does well on all kinds of soil, but seems to respond quicker in a slightly sandy and rocky environment.

Henequen (Sisal) in Tamaulipas.

The zapupe plant is attracting great attention throughout the Mexican Republic, but notably in the State of Tamaulipas. The excellent results which it gives have led many planters to regard it as vastly superior to the renowned henequen plant which has made the State of Yucatan one of the richest in the country, and enables many of its inhabitants to live abroad in most luxuriant comfort; but recent experiments with the henequen plant in Tamaulipas have demonstrated that, if planted in that State, it will far excel the zapupe, the supposed superiority of the latter plant being due to the fact that a comparison was made, with the results obtained in Yucatan.

It has been shown that in Tamaulipas the henequen produces twice the quantity of fibre that is obtained from the zapupe, and five times the amount of fibre produced in Yucatan from the henequen.

One hundred henequen plants in Tamaulipas produce 235 kilos (517 lb.) of fibre, whereas the same number of plants in Yucatan produce only 35 kilos (77 lb.).

Furthermore, it is stated that the henequen produces in Tamaulipas in one-half the time that is required in Yucatan.

Altogether the outlook is bright for the people of Tamaulipas. They may soon be vying with the Yucatecos in the number of millionaires among them.

To Exploit Henequen.

A company has just been formed to exploit the henequen plant on a large scale. It proposes to use every part of the plant. The fibre will be used as it now is for fibre products, the pulp will serve to make excellent paper, and the juice for the manufacture of alcohol. This will, in all probability, give an extended area to the henequen lands, for the plant can be grown now in places where it does not produce fibre good enough to make it a commercial product; but, if to the value of the fibre be added that of alcoholic and paper products, this will give a different aspect to the poorer classes of henequen fibres.

RUBBER PRODUCTION.

The total acreage of rubber plantations in Asiatic countries at present is approximately as follows:—

	Acres.
The Straits and Malay States	30,000
Sumatra	5,000
Java	5,000
Ceylon	25,000
India and Borneo...	5,000
Total	70,000

This acreage will be in full bearing in 1911.

Allowing a yield of 200 lb. per acre, 14,000,000 lb. of rubber will be produced by the above countries in 1911.

The world's production of rubber in 1898 was about 134,000,000 lb.

The present production is about 156,000,000 lb.—"Hawaiian Forester."

COTTON-GROWING—KEEPING THE CROP CLEAN.

By DANIEL JONES.

As many are at this season growing areas of cotton, the following notes on the control of the Cotton Boll Worm, *Aleitia Argillana*, will be of service, particularly as the season promises to be wet and favourable to the development of this pest:—

American authorities, by paying careful attention to the production of trap crops, such as maize, find the ravages of the boll worm reducible to a very minor degree. Prior to this method being adopted, the losses were very extensive, as they were in Queensland in past years, when growers found the pest in wet seasons most disastrous.

The practice now in vogue in the cotton States is to allow a strip of ground to remain unsown—say, sufficient to sow five rows of maize for every twenty-five rows of cotton. At the time of the cotton-sowing one row of maize is thinly sown, as too many plants would entail too much examination.

The object in view is to attract the moth, the parent of the caterpillar, to lay its eggs on the silk of the embryo maize cob. During the silking period frequent examinations are necessary as to the number of boll worm eggs thereon. As soon as no more fresh eggs are found each morning, the silk ends

of the corn should be cut away and burned or fed to stock in order to destroy the young worms and eggs. A few eggs may be found upon the leaves of the plants, and since no more growth is to be made the plants should be cut and destroyed. Then three more rows should be planted. Upon these rows very large numbers of eggs will be laid, but they should be allowed to mature in order that the natural enemies which parasitise the eggs and prey upon the larvæ may not be destroyed.

It is said the crowded condition of the worms will induce cannibalism to such an extent that the number of worms reaching maturity will be reduced to the minimum, and these can well be allowed to escape if their natural enemies are saved thereby. To trap these escaping individuals, however, the fifth and last row of maize should be planted so that the plants will be silking about the time this brood of moths is coming out. This last row should be carefully watched, and destroyed as soon as it appears that no more eggs are being deposited.

If the first two plantings of maize are well managed, the earlier broods of the boll worm will be so reduced in numbers that the third planting may be dispensed with; also, the maize produced by the second planting ought to be sufficient to pay the expense of cultivation and for the sacrifice made by growing maize instead of cotton. It is quite unnecessary to plant up the whole of the cotton area as above; if 5 acres for every 100 be treated with trap maize, the crop of the entire plantation may be protected.

It is also advisable to plant about a dozen yards with maize where the clearing borders on unbroken land. Where cut-down crops are being grown, patches of maize must be planted if it is desired to protect the cotton crop. Clean farming is a great help, because weeds which would harbour the pest are destroyed, and when the land is turned over in the cold season the pupa is killed by the cold or destroyed by birds and insects.

It is also suggested that close-headed crops, such as white and red Kafir corn and some of the sorghums, may, in the late part of the season, prove of value in attracting the moth from the more valuable cotton plant. These, when infested (as they usually are) by this worm, can always be of use if fed to poultry, which will appreciate the variety of live meat and grain comprising the menu.

A spray used is Paris green, 1 lb. to 6 lb. of lime. This, if dissolved in 200 gallons of water, prepared from 6 to 10 days prior to using, and stirred daily to get the ingredients well dissolved, is sufficient to treat 1 acre. It should be constantly stirred when using. It can also be used in the proportion stated as a dust spray, and applied either with an ordinary sulphur bellows or by the more speedy method of shaking the material over the plants, using hessian or some other suitable material.

Cotton-growers should note that a wealthy syndicate has been formed in the United States to work up all cotton locally grown. We may, therefore, look for big cotton mills, a shortage of exports to England, and consequently increased prices for Queensland growers.

MALTHOID AND P. AND B. PAPER.

In the notice in our last issue of the Journal, the material malthoid was described as malthoid paper, which may be somewhat misleading. The malthoid is made from wool felt and 100 per cent. pure mineral, and in different thicknesses, called ½-ply and 3-ply—the former being used for roofing, and the latter for both roofing and floors. Extra heavy P. and B. paper, 3 or 4 ply, is used for roofing and is gravelled; other papers for lining silos, chilling rooms ceilings, walls, and floors.

Animal Physiology.

THE INFLUENCE OF EXERCISE ON THE DIGESTION AND ASSIMILATION OF HORSES.

Dr. A. Scheunart, Berlin, has made experiments on twenty-three aged horses, all of the same age and all in perfect health, which were, for a certain time, fed entirely on oats. This preparatory period facilitated the study of the manner in which each animal took his food, the mastication, the salivation, the rapidity of consumption, &c. Those horses which exhibited no anomaly at this stage were stabled at the Veterinary Institute at Dresden, and were fed for several days on the usual rations, but immediately before the close of the experiment they only received pure hay. This diet, which had for its object the getting rid of all residue of oats in the intestines, was followed by a period of 36 hours during which the animals only received water, and could obtain no other nutriment, solid or liquid. After this, they were given a ration of 1,500 gr. ($3\frac{3}{10}$ lb.) of oats. Then the test horses were kept in the stable, whilst the others were exercised, either by lunging or with the saddle. Great care was taken to avoid fatiguing them. When they had been exercised for an hour, they were rested for intervals varying from 10 to 25 minutes.

After periods of repose or of exercise lasting exactly 1, 2, 3, 4, and 5 hours, the horses were killed by means of an apparatus charged with powder, and were at once bled. The stomach and intestines being always subject during the death throes to very pronounced movements which might have drawn into the small part of the stomachic content passes into the intestine of a horse, if the eviscerated immediately after they were slaughtered, in order to apply ligatures to the pylorus (the lower orifice of the stomach) and the intestines. The small intestine was ligatured in sections of from 1 to 2 metres ($3\frac{1}{4}$ to $6\frac{1}{2}$ feet), so as to prevent all displacement of its contents.

Of the 23 horses utilised in the experiment, 14 were rested after feeding, whilst 9 were exercised; 7 were killed after the lapse of 1 hour, 7 after 2 hours, 4 after 3 hours, 2 after 4 hours, and 2 after 5 hours. The conclusions arrived at by Scheunart may be summarised as follows:—

1. That exercise during digestion retards the passage of food in the intestine, and consequently the emptying of the stomach. This is proved even by the gait. During the first hours following a moderate feed, only a very small part of the stomachic content passes into the intestine of a horse, if the animal is kept moving. After the first hours this retarding action diminishes in intensity, but is still very marked.

2. The stomach of animals in motion always contains more fluid than that of animals in repose (70 to 80 per cent., as against 60 to 70 per cent.).

3. This abundance of fluid is attributable to the more active secretion of the mucous membrane of the stomach.

4. But, notwithstanding this abundance of fluid content, the gait or pace, when trotting or even galloping, does not effect the mashing up of the contents of the stomach. The physical and chemical differences between the ingesta near the cardia, those close to the pylorus, and those which occupy the centre of the organ, remain distinct. This fact has been proved by Ellenbeyor, Hofmeister, and Goldschmit in the case of horses, pigs, and dogs. The mashing up of the alimentary materials is, therefore, not produced in the stomach, which is quite contrary to the teachings of the greater number of physiologists.

5. The stomachic digestion of the carbo-hydrates, always a matter of importance, is notably increased by exercise. The carbo-hydrates of oats present in the stomachs of horses at rest were not digested by 30 to 40 per cent. until about three hours after feeding, whilst the same proportion of digested matter was observed in two hours in the case of horses which had been exercised. Thus motion had notably accelerated digestion.

It was likewise proved that animals which had been set to work after feeding had rendered in one hour more starch soluble than the resting horses had succeeded in doing in two hours. This seems to be due to the fact that acidity can only be produced slowly, the stomach being filled with an alkaline saliva rich in ptyalin.

6. The nitrogenous matters, on the other hand, were digested in less proportion during the first hours by exercised horses, which appears to be due to the quantity of fluid contained in the stomach, where the acidity can only slowly attain the concentration necessary to proteolysis. After some hours, on the contrary, proteolysis becomes stronger.

7. Exercise increases the stomachic secretions, notably of the enzymes, the hydrochloric acid, and the water. The acceleration of amylolysis and of proteolysis is only explicable by this fact.

8. Motion not only accelerates digestion, but also the absorption of alimentary matter.

9. Five hours after feeding, it may be admitted that half the carbohydrates and nitrogenous matter remaining in the stomach are absorbed, both in the case of horses at rest and horses at work. Therefore, the stomach possesses a very high power of absorption.

10. The passing of food from the stomach to the intestine is performed very regularly; consequently, there is no rapid transmission of food easy of digestion, nor slow passage of less digestible food.

11. The digestion and absorption carried on in the stomach are more important than has hitherto been believed to be the case, notably in view of the results obtained by the evacuation of this organ. The greater portion of the food remains in the stomach for at least six hours.

12. The passage of the contents of the stomach into the intestine begins early, probably actually during the act of feeding, but the quantities which thus pass are very small until the fourth or fifth hour, as has been proved by Ellenberger.

13. The digestion and resorption of chyme in the intestine are scarcely influenced by exercise. Still it can be shown that, in this case, there is a greater abundance of fluid and a certain increase in solubility and absorption of carbo-hydrates.

14. Digestion of food is, to sum up, markedly favoured by exercise. After two or three hours, the digestion of the starch is in the proportion of 35 to 50 per cent., according to whether the horses rest or work; 33 to 35 per cent. of nitrogenous materials are then digested.

15. The total absorption itself is accelerated by corporal exercise. After two or three hours, from 20 to 30 per cent. of hydro-carbons and 20 to 25 per cent. of nitrogenous matter are absorbed. The second figures of these proportions refer to animals which have been kept moving. After five hours, the absorption reaches 50 to 60 per cent.

16. The horses which had been exercised before feeding, and which afterwards had rested during and after feeding, showed neither acceleration nor diminution of the activity of the stomach.—"Revue générale Agronomique."

General Notes.

A FERTILISER AND WEED-KILLER.

A French farmer has discovered that the refuse from gasworks containing iron cyanide is both a weed-killer and a fertiliser. To crowd out the weeds with clover and other close-growing crops is, no doubt, the best and cheapest method where the weeds are not too thick. But in far too many places that is no longer feasible. To mow the thistles and nettles where they have overspread the whole surface is effective for the time (says an English paper), but unless it be done in the evening just before a severe frost, which so penetrates them, through the "bleeding" pores, as to kill the very roots, the toilsome process has to be repeated constantly. But the French farmer's experience with the refuse from the gasworks ought surely to constrain every farmer and landowner in Great Britain to an immediate application of the precious yet inexpensive remedy. To be enabled not merely to destroy the weed pests utterly, root and branch, flower and fruit, but to find also that the spontaneous action of the atmosphere has changed the chemical refuse as soon as it has done its work of beneficial destruction from poisonous cyanide into productive saltpetre, surely such a veritable and invariable farmer's friend should be hailed with acclamation throughout the country.—"N.Z. Farmers' Weekly."

POPULARISING THE TELEPHONE.

Why should the telephone still be an expensive luxury in the States of the Commonwealth? In the United States, farmers all over those vast territories are in touch with the great and small centres of population by means of cheap telephones. It appears to us that the Federal Post and Telegraph authorities utterly fail to understand the value of this means of communication in saving the farmer time, labour, and the wear and tear of his horses and carts. In the United States it is stated that in Indiana, Michigan, Wisconsin, and Illinois there are 30,000 farmers in each of those States connected with the telephone at a cost of from £2 10s. to £4 per annum, and that, by keeping them in touch with the markets, the lines are worth £12,000,000 per annum to them. So cheap are the rates charged by the companies that families in the bush hold meetings over the telephones, and neighbours gossip with each other for hours on the long winter evenings across the wires. At Barcaldine, in our Western country, many farmers are connected by the town exchange with each other, the fencing wires being utilised for the purpose. Many a weary and useless trip to the town is saved by farmers living 10 or 12 miles away from Barcaldine, the time thus saved being advantageously employed on the farm.

PRESERVING TOOL HANDLES.

A smple method of strengthening and preserving the handles of tools used on the farm is as follows:—Bore a 5-16th inch hole, 3½ inches deep, in the top end of the handle. Fill this with clean-running oil, and leave the fork (or whatever implement it may be) standing overnight. By morning most of the oil will have soaked down through the handle. Fill again, and cork the hole with a wooden peg. Should you think the handle needs more oil at any time, it is an easy matter to bore out the cork and fill again. It answers equally well for the handles of axes, slashers, shovels, forks, picks, hoes, and most of the other tools about the farm.—"Northern Planter."

A CLOSE SEASON FOR NATIVE BEARS AND OPOSSUMS.

It has been notified that, by an Act of Parliament passed in October last, native bears and opossums are protected from the 1st November to the 30th April, although the provisions of the Act will not apply to opossums until January, 1907. Those interested in the fur trade, trappers, dealers in skins, and young people who take their holidays in the bush, and are fond of "mooning" 'possums and bears, will do well to note that severe penalties attach to the breaking of the law in this respect. The penalty for killing these animals during the above-mentioned close season is up to £5. Cyanide of potassium and other poisons lately used for killing fur-bearing animals are expressly unlawful, and anyone making use of such substances is liable to a fine of £10. By a clause in the Act, however, when opossums are found to injure any field or garden crops, it is lawful to destroy them. Aboriginals may also kill any marsupials or native bears for food, and we presume that there is nothing to prevent the natives from selling the skins of such animals as have served them for food.

A NEW TESTING SYSTEM.

Mr. D. D. Hyde, Government Poultry Expert, informed a representative of a Christchurch paper that he is testing a new method of measuring the egg-producing capacity of a hen, and is very sanguine of the result. The test, which is being carried out at Momohaki, was applied to ninety pullets of similar age and breed which have been separated into three pens—good, indifferent, and bad, as determined by the test—the egg yield being carefully noted. The result for the first week showed that the "good" pen laid twice as many eggs as the "indifferent" pen; and the "indifferent" pen four times as many eggs as the "bad" pen, thus emphatically testifying to the accuracy of the new tests. Mr. Hyde stated that the system was a patented American method of ascertaining the egg-laying abilities of a hen. He purchased the secret from the New Zealand agent for two guineas under pledge of secrecy, and at the end of the experiment—about three months—if the results still show the test to be reliable, he intends to bring the matter under the notice of the Minister to see what can be done in the way of securing the full benefits of the system, which he considers will be of immense value to farmers.—"N.Z. Farmers' Weekly."

HOW TO TAKE A SWARM OF BEES.

From a hive previously prepared for the purpose, take all the frames of brood except two, filling the vacant space with full sheets of foundation or combs ready built, and then, after introducing an Italian queen, proceed to the scene of action.

Take with you all the necessary tools, &c., so that progress may not be hindered in substituting articles accidentally left at home. Among the necessities are: The nucleus hive, lumber for platforms, Porter bee-escapes for each hole, nails, saw, and a good smoker. An assistant is needed, and, after getting a position near the entrance to the wild-bee hive, adjust the Porter escape so that all bees inside must pass out, not to return. Then construct the platform so that, when the nucleus hive is set thereon, the entrance of it will face and be next to the exit of the escape. Now, blow a whiff or two of smoke into both entrances, and the whole operation will be finished for the time being. After five or six weeks have elapsed, fire up the smoker, throw in a small handful of sulphur, pull off the Porter escape, and apply the fumes vigorously through the hole, changing the air inside, leaving a dainty harvest for your swarm on the outside to rob out, which they will surely do in less than ten days.

HOW TO THROW A HORSE.

To thoroughly take the conceit out of a horse there is no better way than to throw him. It certainly requires pluck and determination to throw a horse single-handed, but, if done, your horse is virtually conquered for good and all. To do this, put a good strong halter on your horse, take a strap with a ring in it and buckle it round the horse's off fore leg below the fetlock joint; take a rope 8 feet long and tie it to this strap; place a surcingle round the horse's body; take up your position on the right side of the horse, bring the rope over the horse's back from the off side; take hold of the rope, and pull his foot to his body; take a firm hold of this foot, holding it in that position; then take hold of the horse's halter with the left hand, pull his head to you, and press against his body with your elbow, using the words, "Lie down."

The majority of horses can be thrown in this way in under a minute, while others, of course, may fight longer. As soon as the animal has been thrown, take the rope that is underneath him, bring it in under the surcingle, and pass it through the ring of the halter and back under the surcingle again, and thus you have the rope in position to bring his head over his shoulder. Make him put his head on the ground, and, if he makes any attempt to get up, pull his head up immediately, which will prevent him from rising. This will give him thoroughly to understand that you are master. Once a horse realises your power over him he will do almost anything a horse can do. —"Horseman."

TROPICAL PRODUCTS IN LIVERPOOL.

Messrs. Taylor and Co., of No. 7 Tithebarn St., Liverpool, report as follows concerning Mexican products:—

Coffee: Steady at 38s. to 60s. per cwt.

Cacao: Very firm at 50s. to 55s. per cwt.

Sisal Hemp: Firm and dearer. £35 per ton in spot; £34 c.i.f. to arrive.

Rubber: Quiet, but steady. Mexican and Central American scrap is worth 3s. 4d. to 4s. per lb.

MEAT PRESERVATION—AN ITALIAN IDEA.

The Craveri method of preserving meat, of which a great deal was heard some months ago, has been subjected to searching inquiry and experiment by a number of university professors, and is reviewed in a recent report by the Italian Minister of Agriculture. By the Craveri process meat is preserved in a fit and edible condition by the use of perfectly harmless chemicals. Ordinary antiseptics are not used at all, and the usual method of salting is regarded as quite insufficient. Instead, the slaughtered animals, from whose veins the blood has been drained, are injected with a mixture of kitchen salt 25 parts, acetic acid 4 parts, and water 100 parts. These are, of course, merely substances which are found normally in our bodies, and constantly form part of our regular food. The amount of this solution injected is one-tenth in weight that of the animal treated. In one of the experiments a sheep and a calf were treated, and the carcasses subsequently hung up for 75 days in a room kept at a constant temperature of 60 degrees Fahr. They were then skinned and dressed in the usual way. The heart, brains, liver, and intestines were normal in appearance, though somewhat macerated. The fat was perfectly preserved, and the flesh is described as being bright red in colour, moist, and of an agreeable odour. There was no trace of even incipient decay anywhere; and, the final proof being in the eating, the meat was subjected to various usual culinary operations, and was found to be tender, digestible, nutritious, and to taste "even better than ordinary meat." Bacteriological examination proved the meat to be free from bacteria, and all the professors were unanimous in the conclusion that the Craveri process of preservation promises great advantages over all others.—"Chambers's Journal."

Answers to Correspondents.

TO PROTECT SEED MAIZE FROM BANDICOOTS.

F. F. NIXON, Ingham road, Townsville—

Tar is the best remedy we know of. It need not be thinned. Coat the seed thinly, and the bandicoots, although they may grub out some of the seed, will not eat it.

BLACK SPOT OF GRAPES.

G. P. MOREY, Wingfield, Eidsvold—

The disease, says Mr. C. Ross, manager of Westbrook State Farm, is no doubt the "Black Spot" or anthracnose of the vine. It is almost certain to attack the vines, which he says are now clean, if they are any way near the affected ones. Some varieties are much more liable to the disease than others, and even varieties usually immune may contract it when planted on a stiff clay bottom or in cold or damp soil, more especially when the atmosphere is warm and muggy.

The best summer check to its ravages is continuous spraying with Bordeaux mixture, say, at intervals of ten days or a fortnight. Next spring, just before the buds burst, swab the whole of the vine with a concentrated solution of 5 lb. sulphate of iron in 1 gallon of water, and add half a pint of sulphuric acid. This is the best remedy I have ever used. It should always be followed, however, with Bordeaux mixture during active growth.

Times of Sunrise and Sunset, 1906.

DATE.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·3	5·33	5·29	5·47	4·59	6·5	4·46	6·28
2	6·1	5·34	5·28	5·47	4·58	6·6	4·46	6·29
3	6·0	5·34	5·27	5·48	4·57	6·7	4·46	6·30
4	5·59	5·35	5·26	5·48	4 56	6·8	4·46	6·31
5	5·58	5·35	5·25	5·49	4·55	6·9	4·47	6·31
6	5·57	5·36	5·24	5·49	4·55	6·10	4·47	6·32
7	5·56	5·36	5·23	5·50	4·54	6·10	4·47	6·32
8	5·55	5·37	5·22	5·51	4·54	6·11	4·47	6·33
9	5·54	5·37	5·21	5·51	4·53	6·11	4·48	0·34
10	5·53	5·38	5·19	5·52	4·52	6·12	4·48	6·35
11	5·52	5·38	5·18	5·52	4·52	6·12	4·48	6·36
12	5·51	5·39	5·17	5·53	4·51	6·13	4·48	6·37
13	5·50	5·40	5·16	5·54	4·51	6·13	4·49	6·37
14	5·48	5·40	5·15	5·54	4·50	6·14	4·49	6·37
15	5·47	5·41	5·13	5·55	4·50	6·15	4·49	6·38
16	5·46	5·41	5·12	5·55	4·50	6·15	4·49	6·38
17	5·45	5·42	5·11	5·56	4·49	6·16	4·50	6·39
18	5·44	5·42	5·10	5·56	4·49	6·17	4·50	6·39
19	5·43	5·43	5·9	5·57	4·48	6·18	4·50	6·40
20	5·41	5·43	5·8	5·58	4·48	6·19	4·51	6·41
21	5·40	5·44	5·7	5·59	4·48	6·20	4·51	6·41
22	5·39	5·44	5·6	6·0	4·47	6·21	4·52	6·42
23	5·38	5·44	5·6	6·1	4·47	6·21	4·52	6·42
24	5·37	5·45	5·5	6·1	4·47	6·22	4·53	6·43
25	5·35	5·45	5·4	6·2	4·47	6·23	4·53	6·43
26	5·34	5·45	5·3	6·2	4·46	6·24	4·54	6·44
27	5·33	5·45	5·3	6·3	4·46	6·25	4·54	6·44
28	5·32	5·46	5·2	6·3	4·46	6·26	4·55	6·44
29	5·31	5·46	5·1	6·4	4·46	6·27	4·56	6·45
30	5·30	5·46	5·0	6·4	4·46	6·27	4·56	6·45
31	...	...	4·59	6·5	...	...	4·57	6·45

PHASES OF THE MOON.

			H.	M.	
2 Sept.	○	Full Moon	9	36	p.m.
10 ,,	☽	Last Quarter	6	53	,,
18 ,,	●	New Moon	10	33	a.m.
25 ,,	☾	First Quarter	4	11	,,
2 Oct.	○	Full Moon	10	48	a.m.
10 ,,	☽	Last Quarter	1	39	p.m.
17 ,,	●	New Moon	8	42	,,
24 ,,	☾	First Quarter	11	49	a.m.
1 Nov.	○	Full Moon	2	45	a.m.
9 ,,	☽	Last Quarter	7	44	,,
16 ,,	●	New Moon	6	36	,,
22 ,,	☾	First Quarter	10	39	p.m.
30 ,,	○	Full Moon	9	7	,,
8 Dec.	☽	Last Quarter	11	45	p.m.
15 ,,	●	New Moon	4	54	,,
22 ,,	☾	First Quarter	1	3	,,
30 ,,	○	Full Moon	4	43	,,

The approximate times for sunrise and sunset at Rockhampton, Townsville, and Cooktown may be obtained by *using the table for Brisbane, and adding* the following figures:—

	ROCKHAMPTON.		TOWNSVILLE.		COOKTOWN.	
1906.	Rise.	Set.	Rise.	Set.	Rise.	Set.
September 1 to 22	9 m.	11 m.	24 m.	30 m.	27 m.	35 m.
,, 23 to 30	10 m.	10 m.	28 m.	26 m.	32 m.	30 m.
October ...	12 m.	8 m.	32 m.	22 m.	38 m.	24 m.
November ...	16 m.	4 m.	40 m.	14 m.	50 m.	12 m.
December ...	18 m.	2 m.	44 m.	10 m.	55 m.	7 m.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE TOTAL RAINFALL FOR EACH MONTH OF THE YEAR IN THE AGRICULTURAL DISTRICTS OF QUEENSLAND.

STATIONS.	1905.			1906.									
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.
North.													
Bowen	0·05	3·91	0·04	12·84	8·73	6·29	0·78	6·34	0·69	0·04	0·36	3·41	1·76
Cairns	0·46	1·72	0·53	7·00	16·87	16·05	5·20	4·04	3·44	*2·28	1·79	1·57	0·56
Geraldton	0·22	5·44	1·14	15·61	37·67	19·67	11·51	7·93	16·05	5·73	6·65	4·26	2·28
Herberton	0·21	1·69	0·51	15·20	3·73	4·67	1·25	1·38	1·04	0·59	0·55	0·38	0·30
Hughenden	0·13	0·07	0·14	6·11	3·93	8·47	0·12	Nil	Nil	Nil	Nil	0·92	0·61
Kamerunga	0·63	1·05	0·33	7·25	13·76	14·93	4·94	4·13	3·55	2·49	2·03	2·56	0·72
Longreach	0·06	0·77	0·17	3·99	8·61	12·25	Nil	0·22	Nil	0·11	Nil	4·11	2·16
Lucinda	0·68	2·03	0·95	10·13	49·97	25·88	10·12	3·77	3·02	*0·40	†	Nil	1·85
Mackay	0·08	2·45	0·70	13·58	9·88	16 57	2·87	11·87	3·85	0·68	0·93	4·35	*2·37
Rockhampton	0·91	1·05	4·77	4·24	15·31	8·26	Nil	5·27	1·12	Nil	2·61	3·80	1·07
Townsville	0·52	0·19	Nil	10·05	17·31	4·28	0·38	1·80	0·30	Nil	0·46	3·25	1·45
South.													
Barcaldine	0·15	1·49	1·30	4·00	7·07	13·84	Nil	1·70	0·19	0·10	Nil	2·88	2·92
Beenleigh	2·82	1·76	3·77	4·96	15·11	9·34	0·04	3·57	1·47	0·16	2·94	3·47	2·94
Biggenden	2·56	1·14	11·66	2·27	8·24	4·61	0·45	5·77	1·42	0·48	3·02	5·07	1·19
Blackall	0·29	1·45	0·83	5·13	11·14	11·99	Nil	1·75	0·22	0·48	0·02	4·70	5·86
Brisbane	2·22	3·63	8·21	4·16	12·71	4·85	0·45	3·23	1·38	0·22	4·21	3·48	3·81
Bundaberg	2·37	0·95	6·74	6·92	9·92	1·90	1·17	8·44	2·01	0·03	1·86	10·90	1·57
Caboolture	2·73	2·88	6·72	8·11	12·73	6·46	0·49	4·53	0·85	0·29	3·02	4·77	4·73
Charleville	0·99	0·68	0·12	1·29	10·66	3·15	0·07	...	0·13	2·34	0·35	4·99	2·66
Dalby	2·09	1·60	5·67	4·15	4·43	5·15	1·81	0·66	0·87	1·58	2·78	2·65	2·96
Emerald	0·64	4·41	0·80	6·12	7·81	5·22	0·08	2·12	0·17	Nil	1·62	4·47	1·55
Esk	3·21	3·65	5·98	5·49	6·79	9·04	1·74	3·25	0·77	0·38	4·51	4·14	2·90
Gatton College ...	2·59	3·59	4·73	3·75	5·33	9·43	1·40	1·90	0·60	0·41	3·73	3·54	2·25
Gayndah	2·38	1·93	5·58	2·81	9·65	5·86	0·51	5·10	0·48	0·22	2·34	5·14	2·25
Gindie	1·11	3·79	Nil	1·92	9·15	5·92	Nil	2·32	0·05	Nil	1·46	4·57	3·20
Goondiwindi	3·57	1·51	2·72	1·08	2·60	2·19	0·37	2·80	0·98	0·49	4·35	3·33	2·36
Gympie	1·48	1·44	5·03	6·07	7·38	5·58	0·45	6·88	2·26	0·52	3·19	3·97	3·03
Ipswich	2·91	3·32	3·64	5·30	7·22	3·87	0·12	1·67	0·25	0·17	2·59	2·94	2·60
Laidley	2·36	3·59	3·73	3·29	5·63	6·73	0·35	2·83	0·49	0·50	3·26	3·19	2·87
Maryborough	2·48	0·70	4·03	4·46	8·34	6·77	1·08	4·85	2·55	0·15	2·31	6·48	1·22
Nambour	4·70	0·85	5·37	7·01	16·50	9·35	1·13	6·20	3·68	0·61	4·52	8·94	4·79
Nerang	4·59	2·21	5·14	5·01	13·68	10·04	0·87	10·32	1·98	0·12	3·56	6·42	8·26
Roma	1·02	2·15	2·62	2·18	12·95	3·94	Nil	1·09	1·08	1·65	1·47	4·43	2·37
Stanthorpe	3·48	1·94	4·43	6·06	2·76	3·18	2·00	0·77	0·45	1·44	3·37	4·29	2·90
Tambo	0·85	1·57	0·39	5·09	9·05	10·63	Nil	0·66	0·05	0·67	0·07	5·17	2·85
Taroom	0·76	1·11	2·52	1·86	13·73	6·02	0·23	1·04	0·81	0·60	2·30	4·26	1·70
Tewantin	6·57	1·28	6·64	12·07	18·59	7·57	2·27	4·61	5·68	0·39	4·25	6·37	4·38
Texas	3·54	0·94	4·54	3·41	2·11	1·94	1·89	1·57	0·75	0·90	3·22	2·77	3·42
Toowoomba	2·59	2·09	3·20	6·17	6·58	8·87	2·07	2·65	0·85	1·81	3·63	4·64	2·76
Warwick	4·00	2·16	3·98	2·09	2·21	6·27	0·37	0·77	0·57	1·16	3·85	3·13	2·47
Westbrook	2·60	3·62	2·39	5·00	4·01	5·12	0·93	0·50	0·55	1·67	2·80	3·34	3·41

* From telegraphic reports—subject to alteration. † No reports received.

GEORGE G. BOND,
For the Hydraulic Engineer.

The Markets.

PRICES FOR FRUIT—ROMA-STREET MARKETS.

Article.	NOVEMBER. Prices.
Apples, Eating, per packer, Hobart	10s. to 13s.
Apples, Cooking, per packer, Hobart	7s. 6d. to 10s. 6d.
Apples, American, per packer	...
Apples, Cooking, per packer	7s. 6d. to 9s. 6d.
Apples, Local, per packer	...
Apricots, quarter-case	...
Bananas, Local, per bunch	2s. to 3s.
Bananas, per case	6s. to 7s.
Bananas, Fiji, per bunch	2s. 6d. to 6s.
Bananas, Fiji, per case	11s. 6d. to 12s. 6d.
Cherries, quarter-case	...
Comquats, case	...
Lemons, per case, Local	5s. to 8s.
Lemons, per quarter-case, Imported	from 3s.
Mandarins	3s. 3d. to 5s. 6d.
Mangoes, per case	2s. 6d. to 4s.
Oranges, per packer, Imported	...
Oranges, Local, per packer	5s. 6d. to 6s.
Papaw Apples, per case	5s.
Passion Fruit, gin case	18s.
Peaches, per case	3s. 9d. to 4s. 3d.
Peanuts, per lb.	2½d.
Pears, Imported, per quarter-case	...
Pineapples (rough leaf), per dozen	4s. 6d. to 6s. 6d.
Pineapples (smooth leaf), per dozen	7s. 6d. to 9s. 6d.
Plums, Imported, quarter-case	...
Plums, Local, quarter-case	...
Quinces, Imported, per case	...
Rockmelons, per dozen	...
Strawberries, per tray	1s. to 2s. 6d.
Tomatoes, quarter-case	1s. to 2s. 3d.
Watermelons, per dozen	...
Cape Gooseberries, per quart	3½d. to 5d.
SOUTHERN FRUIT MARKET.	
Apples, per case	8s. to 14s.
,, Tasmanian, per case	9s. to 12s.
,, American, per case	to 16s.
Cherries, quarter-case	8s. to 9s.
Gooseberries, quarter-case	3s. to 3s. 6d.
Strawberries, per dozen punnets	4s. to 6s. 6d.
Bananas, Queensland, per case	7s. to 8s.
,, ,, per bunch	1s. 6d. to 3s.
,, Fiji, per case	12s. to 14s. 6d.
,, ,, per bunch	4s. to 7s.
Chillies, per bushel	6s.
Lemons, per gin case	3s. 6d. to 10s. 6d.
Mandarins, case	4s. to 11s.
Oranges, per case	2s. to 20s.
,, Queensland, per packer	3s. 6d. to 15s.
Passion Fruit, per case	6s. to 20s.
Pineapples, case	5s. to 10s.
,, per double case	...
Rockmelons, case	...
Tomatoes, Local, case	4s. to 4s. 6d.
,, Queensland, per quarter case	4s. to 5s.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR NOVEMBER.

Article.		NOVEMBER. Prices.
Bacon (Pineapple)	lb.	7½d. to 9d.
Bran	ton	£3 12s. 6d. to £3 17s. 6d.
Butter, Factory	lb.	10½d. to 1s.
Chaff, Mixed	ton	£3 to £3 15s.
Chaff, Oaten	"	£4 3s. 9d. to £4 7s. 6d.
Chaff, Lucerne	"	£2 12s. 6d. to £3 5s.
Chaff, Wheaten	"	£2 15s.
Cheese	lb.	6½d. to 7d.
Hay, Oaten	ton	£5 to £5 5s.
Hay, Lucerne	"	£1 12s. 6d. to £2 10s.
Honey	lb.	1¾d. to 2½d.
Maize	bush.	2s. 3½d. to 2s. 5½d.
Oats	"	...
Pollard	ton	£3 15s. to £4 3s. 9d.
Potatoes	"	£5 10s. to £7 10s.
Wheat, Milling	bush.	...
Wheat, Chick	"	3s. to 3s. 9d.
Onions	ton	£9 to £12.
Hams	lb.	10½d. to 11½d.
Eggs	doz.	4¼d. to 5¼d.
Fowls	pair	2s. 7d. to 4s. 1d.
Geese	"	5s. to 5s. 6d.
Ducks, English	"	3s. 6d. to 4s. 9d.
Ducks, Muscovy	"	...
Turkeys, Hens	"	6s. 6d. to 7s. 6d.
Turkeys, Gobblers	"	14s. 6d. to 18s.

ENOGGERA SALEYARDS.

Animal.	OCTOBER. Prices.
Bullocks	£9 to £10 12s. 6d.
" (Extra)	£12
Cows (very few)	£7 7s. 6d.
Merino Wethers	26s. 9d.
" Ewes	13s. 9d.
C.B. Wethers	23s. 6d.
" Ewes	20s. 9d.
Lambs	17s. 9d.
Pigs	Nil.

Farm and Garden Notes for January.

FIELD.—The main business of the field will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye, and cow peas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole.

KITCHEN GARDEN.—A first sowing of cabbage, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow, shallow drills; they will then grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering. Give the beds a good soaking every evening. Mulching and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw, grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly, to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather sow French beans, cress, cauliflower, mustard, cabbage, celery, radish for autumn and winter use. Sow celery in shallow, well-drained boxes or small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter, however, are unlikely to succeed except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

FLOWER GARDEN.—To make the flower beds gay and attractive during the autumn and winter months is not a matter of great difficulty. Prepare a few shallow boxes. Make a compost, a great part of which should consist of rotted leaves. Fill the boxes with the compost, then sow thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle, lift them gently one by one with a knife or zinc label—*never pull them up by hand*, as by so doing the tender rootlets are broken, and little soil will adhere to the roots. Then prick them out into beds or boxes of very light soil containing plenty of leaf-mould. Then keep a sharp look out for slugs and caterpillars. Keep a supply of tobacco dust on hand. Scatter this in the path of the slug, and he will cease from troubling you.

All kinds of shrubby plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to over-water at this season. Propagate verbenas, not forgetting to include the large scarlet Foxhunter. Verbenas require rich soil. Palms may be planted out this month. If the weather prove dry, shade all trees planted out. With seed boxes, mulch, shade, water, and kerosene spray, all of which imply a certain amount of morning and evening work, the flower garden in autumn and winter will present a charming sight, and will afford light and profitable occupation for girls with spare time on their hands.

Orchard Notes for January.

By ALBERT H. BENSON.

The Orchard Notes for the month of December apply equally to that of January, especially the remarks anent the handling and marketing of fruit and the treatment of various fruit pests. The fruit of the month is the grape, and growers should take every care to market this fruit properly. The fruit should be cut when dry and cool before the heat of the day, and should be firmly packed into cases of moderate size, as if the grapes are at all tender they are apt to be badly crushed if packed in too large cases. For shipping high-class grapes such as Black Muscat of Alexandria, White Muscat of Alexandria, Waltham Cross, or even Raisin de Dames, I strongly advise growers to use 5-lb. chip baskets, eight or ten of which go to a crate, as the fruit carries better in them and will reach its destination with the bloom on if well packed and carefully handled. The fruit should be sold in the chip basket, so that the purchaser gets the grapes as packed in the vineyard and without being handled by the retailer. This method of packing grapes is common in California, especially where the fruit has to be shipped long distances; and as our best grapes here come from the Roma and Mitchell districts, and are often more or less damaged in transit, it should be of value to us in that it would enable the fruit to be marketed in a better and fresher condition than is the case at present.

I do not think such chip baskets are obtainable in Queensland, but if not they could be easily introduced, as they are now coming into regular use in Melbourne.

Mangoes will also be ripening in the Southern part of the State towards the end of the month, and I strongly advise if any are to be shipped to the Southern States that none be sent unless they are of good quality, as the carrot-flavoured stringy rubbish that has been sent in the past has simply killed the demand for mangoes in the Southern markets, and it will be impossible to open up a trade for our fruit there unless it is of good quality, and this good quality must be maintained. As there is a great deal of uncertainty as to what constitutes a good mango, I may say briefly that a good mango should be fibreless or nearly so, and should have no pronounced unpleasant flavour of carrots or turpentine, but should be either a luscious high-flavoured fruit or a juicy, good-flavoured, sprightly fruit. Too large mangoes are not an advantage, a round mango of 6 or 8 oz. weight being about the best size and shape for packing and carrying.

During the month see that the orchard is kept well cultivated; and in dry districts, where there is water available, citrus trees should receive a good irrigation. Keep the nursery clean, look after all grafts or spring buds, and see that they are growing clean and straight, and where strong enough head back at the height at which it is desired to form the head of the tree. Budding of all kinds of fruit trees can be done during the month, the only requisites to success being that the buds are fully developed and that the bark of the stock runs freely. For budding use a very sharp knife, and see that you cut your buds thin—*on no account remove the wood from the bud*, as it only makes the operation slower and does no good; in fact, the quicker the budding is done, and the less the inner bark of the bud or stock is exposed, the better will be the take. Always tie your buds firmly, especially so at the base of the bud, as it is there that the union must take place. As soon as the bud has taken properly, the ties should be cut; otherwise they are very apt to cut into and destroy the stock.

LIST OF AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES AND ASSOCIATIONS IN QUEENSLAND.

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Allora ...	Central Downs Agricultural and Horticultural Association	J. H. Buxton ...		
Allora ...	The Allora Farmers' Progress Association	P. Donovan ...		
Amby ...	Amby Farmers' Association	W. Jas. Sullivan ...		
Atherton ...	Barron Valley Agricultural, Pastoral, and Industrial Association	G. Bardon	5 and 6 July	4 and 5 July
Atherton ...	The Atherton District Farmers' Association	Fredk. Stewart ...		
Avondale ...	Avondale Farmers and Planters' Association	Edward J. Gayland		
Ayr	Lower Burdekin Farmers' Association	G. S. Mackersie ...		
Ayr	Lower Burdekin Pastoral, Agricultural, and Industrial Association	Philip Grout ...		
Ballandean ...	Lyra Farmers' Progress Association	M. B. Marlay ...		
Barker's Creek	North Barker's Creek Farmers' Progress Association	A. Becker		
Beaudesert ...	Logan and Albert Pastoral and Agricultural Society	A. Winship ...	20 June	8 May
Beenleigh ...	Agricultural and Pastoral Society of Southern Queensland	Wilson Holliday ...	15 Sept.	28 Sept.
Beenleigh ...	Logan Farming and Industrial Association	Wm. G. Winnett, Loganlea		
Biggenden ...	Biggenden Agricultural and Pastoral Society	C. J. Stephensen ...	6 and 7 July	5 and 6 July
Birthamba ...	New Hope Farmers' Association ...	G. W. Nixon ...		
Blackbutt ...	Farmers' Progress Association ...	John Dreghorn ...		
Boonah ...	Fassifern and Dugandan Agricultural and Pastoral Association	C. E. Mackenzie ...	17 and 18 May	6 and 7 June
Booyal ...	Booyal Farmers' Progress Association	Thos. Skillington ..		
Bowen ...	Pastoral, Agricultural, and Mining Association	Geo. Turner ...	11 Aug	17 Aug.
Bowen ...	Proserpine Farmers and Settlers' Association	R. Toogood ...		
Bowen (Proserpine)	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Bowen ...	Bowen Farmers and Fruitgrowers' Association	H. C. Smethurst ...		
Bowenville (Gordon Vale)	Moola Farmers' Progress Association	Alex. Gordon ...		
Brisbane ...	Horticultural Society of Queensland	F. W. Woodruffe ...	...	24 and 25 April
Brisbane ...	Queensland Acclimatisation Society	E. Grimley ...		
Brisbane ...	National Agricultural and Industrial Association of Queensland	Charles A. Arvier	8, 9, 10, and 11 Aug.	7, 8, 9, 10, and 11 Aug.
Brisbane ...	United Pastoralists' Association ...	Fredk. Ranson ...		
Brisbane ...	Queensland Beekeepers' Association	F. Wilsdon Smith		
Brisbane ...	Queensland Chamber of Agriculture	F. W. Peek ...		
Brisbane ...	Queensland Citrus-growers' Asssociation	R. M. Cooper ...		
Brisbane ...	Combined Moreton Association ...	Wm. Ewart ...		
Brookfield ...	The Brookfield and Pullen Vale Farmers, Dairymen, and Fruitgrowers' Association	W. R. Moon ...		
Brooyar ...	Brooyar Farmers' Progress Association	E. Pike		
Buderim ...	Buderim Mountain Coffee and Fruitgrowers' Association	G. O. Burnett ...		
Buderim Mt.	North Coast Central Associatfon ...	James Lindsay ...		
Bundaberg ...	Bundaberg Horticultural and Industrial Society	H. E. Ashley ...		
Bundaberg ...	Council of Agriculture	H. J. Page ...		
Bundaberg ...	Woongarra Canegrowers and Farmers' Association	F. Watson ...		
Bundaberg ...	Bundaberg Agricultural, Pastoral, and Industrial Society	H. J. Page ...	14 and 15 June	26 and 27 Sept.
Burpengary...	Burpengary Farmers' Association ...	F. W. Uhlmann ...		
Byrnestown...	Byrnestown Farmers' Progress Association	Chr. H. Fredriksen		
Caboolture ...	Upper Caboolture Farmers' Association	Jos. Wilson ...		
Cairns ...	Aloombah Farmers' Association ...	N. P. Petersen ...		
Cairns ...	Cairns Agricultural, Pastoral, and Mining Association	J. Reid	7 and 8 Sept.	30 and 31 Aug.

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Cairns ...	Cairns District Coffee-growers' Association	L. Battinson ...		
Cairns ...	Cairns District United Farmers' Association	Wm. Griffin ...		
Cardwell ...	Rockingham Progress Association ...	T. E. Fitzsimmons		
Charleville ...	Central Warrego Pastoral and Agricultural Association	G. M. Bell... ...		
Charters Towers	Towers Pastoral, Agricultural, and Mining Association	A. H. Pritchard ...	31 May, and 1, 2, 3 June	31 May, and 1, 2 June
Childers ...	Isis Agricultural Association	H. Epps		
Childers ...	Doolbi Mill Branch, Isis Agricultural Association	W. T. H. Job ...		
Childers ...	Childers Mill Branch, Isis Agricultural Association	H. Epps		
Childers ...	Childers Pastoral, Agricultural, and Industrial Society	A. Eastaughffe ...	1 and 2 June	14 and 15 June
Childers ...	The Childers Mill Canegrowers' Association	A. Eastaughffe ...		
Clermont ...	Peak Downs Pastoral, Horticultural, and Agricultural Society	F. Leysley		
Clermont ...	Peak Downs Dairymen and Settlers' Association	A. G. Pursell ...		
Cleveland ...	Cleveland Horticultural Society ...	Miles R. Fox ...	14 Oct.	13 Oct.
Clifton ...	Darling Downs Pastoral, Agricultural, and Industrial Association	S. J. B. Just ...	13 Sept.	12 Sept.
Coochin ...	The Coochin Farmers' Progress Association	J. T. W. McLaughlin		
Cooyar ...	Yeraman Creek Farmers' Progress Association	George Seely ...		
Cooran ...	Cooran Progress and Agricultural Association	A. G. Bosanquet ...		
Cordalba ...	Cordalba Farmers' Association ...	J. Jeffrey		
Coulson ...	Coulson Farmers' Progress Association	G. R. Johnson ...		
Crow's Nest	The Crow's Nest Agricultural and Horticultural Society	James Gleeson ...	26 July	24 and 2 July
Croydon ...	The Gulf Mining, Pastoral, and Industrial Association	V. Creagh		
Cunnamulla	South Warrego Pastoral Association	J. Winward ...		
Dalby ...	Northern Downs Pastoral and Agricultural Association	E. Watt	26 and 27 July	25 and 26 July
Dallarnil Scrub, *viâ* Degilbo	Dallarnil Farmers' Association ...	Vincent H. Jones		
Danderoo ...	Danderoo Farmers' Progress Association	T. Campbe ...		
Deception Bay	Deception Bay Farmers' Association	B. J. T. Liscombe		
Degilbo ..	Degilbo District Farmers' Association	J. P. Laugher ...		
Dundowran, *viâ* Maryborough	Dundowran and Takura Settlers' Association	H. J. E. Tooth ...		
Esk	Esk Agricultural, Pastoral, and Industrial Society	Thos. C. Pryde ...	24 and 25 May	29 and 30 May
Eudlo ...	Eudlo Farmers and Fruitgrowers' Progress Association	Walter T. Jeremy		
Flagstone Ck., *viâ* Helidon	Flagstone Creek Farmers' Progress Association	James Scanlan ...		
Forest Hill ...	Forest Hill Agricultural and Progress Association	Wm. Jones ...		
Gayndah ...	Gayndah Pastoral, Industrial, Agricultural, and Horticultural Association	Thomas McMahon		
Geraldton ...	Johnstone River Sugar-growers and Manufacturers' Association	Ralph Reid ...		
Gin Gin ...	Currajong and Gin Gin Agricultural and Pastoral Society	J. R. Hamilton ...	24 May	28 May
Gladstone ...	Gladstone Pastoral and Agricultural Association	W. J. Manning ...		
Gladstone ...	Port Curtis Agricultural, Pastoral, and Mining Association	J. T. W. Brown ...		
Gooburrum, Bundaberg	Gooburrum Farmers and Canegrowers' Association	W. J. Tutin ...		
Goombungee	Goombungee Farmers' Association ...	Thos. Smith ...		
Goondiwindi	MacIntyre River Pastoral and Agricultural Society	E. T. Drake ...	...	1 and 2 May
Goondoon, *viâ* Bundaberg	Goondoon Farmers' Association ...	J. F. Cory		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Gracemere ...	The Gracemere District Farmers and Progress Association	Arthur E. Fisher ...		
Gympie ...	Agricultural, Mining, and Pastoral Society	F. Vaughan ...	13 and 14 Sept.	15 and 16 Aug.
Gympie ...	Chatsworth Farmers' Progress Association	W. Allen		
Gympie ...	Deep Creek Farmers' Progress Association	H. Bath		
Gympie ...	Gympie Horticultural Society ...	Charles Brasch ...		
Gympie ...	Imbil Road Farmers and Settlers' Progress Association	D. J. O'Farrell ...		
Gympie ...	Woondum and Brisbane Road Farmers' Progress Association	Chas. E. Gambling		
Hambledon (Cairns)	Hambledon Planters' Association ...	W. L. Hawkins ..		
Harrisville ...	Harrisville Farmers' Progress Association	W. J. Burnett ...		
Haslemore, Victoria, Herbert Riv.	Herbert River Farmers' League ...	Alfred Henry ...		
Hatton Vale	Hatton Vale Farmers' Progress Association	P. Sharry, junr. ...		
Headington Hill	Headington Hill Farmers' Progress Association	J. E. Stehn ...		
Helidon ...	Helidon Scrub Farmers' Progress Association	James Sweeney ...		
Helidon ...	Monkey Creek Farmers' Progress Association, Withcott, Helidon	Thomas Turner ...		
Hendra ...	Nundah Agricultural, Horticultural, and Industrial Association	Geo. A. Patullo ...	28 Oct.	13 Oct.
Herbert River	Halifax Planters' Club	A. Campbell ...		
Herbert River	Macknade Farmers' Association ...	Edwin S. Waller ...		
Herbert River	Ripple Creek Farmers' Association ...	J. W. Grimes ...		
Herbert River	Fairford Farmers' Association ...	D. G. Scott ...		
Herbert River	United Farmers' Association ...	D. G. Scott ...		
Herberton ...	Mining, Pastoral, and Agricultural Association	John M. Hollway	...	22 and 23 May
Hodgson ...	Hodgson Farmers' Association ...	Fred. Warner ...		
Home Creek, *via* Wondai	Home Creek Farmers' Progress Association	A. Iker		
Hopetoun ...	Hopetoun Pastoral, Agricultural, and Progressive Association	John Walsh ...		
Hughenden ...	Hughenden Pastoral and Agricultural Association	H. G. McLean ...	19 and 20 June	
Ingham ...	Fairfield Farmers' Association ..	B. Lynn		
Ingham ...	Gairloch Farmers' Association ...	B. Lynn		
Ingham ...	Herbert River Pastoral and Agricultural Association (Agricultural Show)	P. J. Cochrane ...	8 and 9 Sept.	
Ingham ...	Stone River Farmers' Association ...	F. A. Rankin ...		
Ingham ...	Victoria Farmers' Association ...	W. C. S. Warren...		
Ipswich ...	Ipswich and West Moreton Agricultural and Horticultural Society	P. W. Cameron ...	...	11 Oct.
Ipswich ...	Queensland Pastoral and Agricultural Society	J. McGill	14 and 15 June	20 and 21 June
Kelsey Creek *viâ* Bowen	Kelsey Creek Farmers' Progress Association	A. Fontaine ...		
Kolan, North	Kolan Canegrowers and Farmers' Association	Jas. H. Hendy ...		
Kilkivan ...	Kilkivan District Farmers and Settlers' Progress Association	J. H. McKewen ...		
Killarney ...	Killarney Farmers' Association ...	J. H Hansen ...		
Kingaroy ...	South Burnett Agricultural, Pastoral, and Industrial Society	T. J. Lacey ...	...	3 and 4 July
Laidley ...	Lockyer Agricultural and Industrial Society (at Gatton)	W. A. McIlwraith	13 July	4 and 5 July
Lakeside ..	Mungore Farmers' Association ...	C. C. Ridley ...		
Lillydale, Helidon	The Flagstone Creek Farmers' Progress Association	Danl. Ryan ...		
Longreach ..	Longreach Pastoral and Agricultural Society	J. P. Peterson ...	8 and 9 May	1 and 2 May
Lucinda Point	Victoria Farmers' Association ...	W. S. C. Warren...		
Ma Ma Creek, *viâ* Grantham	Ma Ma Creek Farmers' Progress Association	A. McKenzie ...		
Mackay ...	Agricultural, Pastoral, and Mining Association	F. Black		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Mackay ...	Pioneer River Farmers' and Graziers' Association	J. P. Moule ...	7 and 8 June	20 and 21 June
Mackay ...	The Mackay and District Horticultural Society	Fred. Bourne ...		
Mapleton ...	Fruitgrowers and Farmers' Progressive Association	W. J. Smith ...		
Mareeba ...	Mareeba Mining, Pastoral, and Agricultural Association	F. Cruckshank ...		
Maroochy ...	Bli Bli Farmers' Progressive and Industrial Association	H. A. Keil... ...		
Maryborough	Maryborough Horticultural Society...	H. A. Jones ...		
Maryborough	The Island Farmers' Progress Association	H. Simpson, junr.		
Maryborough	Wide Bay and Burnett Pastoral and Agricultural Society	A. H. Jones ...	19, 20, and 21 July	23, 24, and 25 May
Miriam Vale	Miriam Vale Farmers' Association	J. Spencer		
Montville ...	Montville Fruitgrowers and Farmers' Progress Association	C. J. Wyer ...		
Mooloolah ...	Mooloolah Farmers' and Fruitgrowers' Progress Association	G. S. Skerman ...		
Mooloolah ...	The United Progress Association, Caboolture, No. 1 Division	C. Court ...		
Mosman River	Mosman River Farmers' Association	Geo. W. Muntz ...		
Mosman ...	Mosman District Agricultural Society	G. W. Muntz ...		
Mount Cotton	Mount Cotton and Redland Bay Fruitgrowers and Farmers' Association	W. E. Burns ...		
Mount Mee...	Mount Mee Farmers' Association ...	Jas. H. Robinson ...		
Mount Morgan	Mount Morgan Agricultural, Pastoral, and Poultry Society	J. S. Lyle ...		
Mount Ubi, Eumundi	The Kenilworth Farmers' Association	Alex. Purdon ...		
Nambour ...	The Rosemount Association	George Etheridge		
Nambour ...	Dulong and Kureelpa Farmers' and Canegrowers' Association	A. A. Petrie ...		
Nambour ...	The Obi Obi Farmers and Dairymen's Progressive Association	A. D. Crichton ...		
Nanango ...	Nanango Agricultural, Pastoral, and Mineral Society	J. W. Sigley ...	12 and 13 April	9 and 10 May
Nanango ...	Coolabunia Farmers' Association ...	Ezra Horne ...		
Nanango ...	Malar Farmers' Association	A. Becker		
Nerang ...	Southern Queensland and Border Agricultural and Pastoral Association	H. J. Cooper ...	13 Oct.	14 Sept.
North Isis ...	North Isis Canegrowers' Association	T. E. Barnes ...		
North Pine ...	Moreton Agricultural, Horticultural, and Industrial Association	N. McKenzie ...		
Oakey ...	Oakey Agricultural and Pastoral Society	E. R. Pace		
Palmwoods ...	Palmwoods Industrial Fruitgrowers' Progress Association	H. Taylor		
Peachester, *viâ* Beerwah, N.C. Line	The Peachester Progress Association	R. G. Denny ...		
Pittsworth ...	Pittsworth Pastoral, Agricultural, and Horticultural Association	C. Longland ...	7 and 8 Feb.	31 Jan.
Pomona ...	Pomona Agricultural and Progress Association	H. Armitage, senr.		
Port Douglas	Port Douglas and Mosman Pastoral, Agricultural, Horticultural, and Mining Association	H. McMahon ...		
Port Douglas	Daintree Farmers' Association ...	J. Carlos Allen Donally		
Proserpine ...	Preston Farmers' and Settlers' Association	R. C. Dagg ...		
Proserpine ...	Cannon Valley Farmers and Settlers' Association	J. H. Ryan ...		
Roadvale ...	Roadvale Progress Association ...	Henry Clark ..		
Rockhampton	Alton Downs Farmers' Association...	Thos. Thomasson...		
Rockhampton	Central Queensland Farmers and Selectors' Association	T. Whitely, Coowonga		
Rockhampton	Central Queensland Stockowners' Association	R. R. Dawbarn ...		

AGRICULTURAL AND HORTICULTURAL SOCIETIES—*continued.*

Postal Address.	Name of Society.	Name of Secretary.	Show Dates. 1905.	Show Dates. 1906.
Rockhampton	Rockhampton Agricultural Society...	A. C. Lyons ...	16 and 17 June	21, 22, and 23 June, 1907
Roma ...	Western Pastoral and Agricultural Association of Queensland	Angus McPherson	18 and 19 July	17 and 18 July
Roma ...	Yingerbay Farmers' Association ...	R. Frederick ...		
Roma (Blythedale)	Warooby Farmers' Association ...	Geo. Munt... ...		
Rosewood ...	Farmers' Club	P. H. Adams ...	6 and 7 Sept.	5 and 6 Sept.
South Kolan	South Kolan Farmers and Planters' Association	John Whalley ...		
Southport ...	Southport Horticultural Society ...	E. Fass		
Spring Bluff	Aubigny Farmers' Progress Association	J. R. Torbock ...		
Springsure ...	Queensland Pastoral Society... ...	G. R. Milliken ...		
Stanthorpe ...	Border Pastoral, Agricultural, and Mining Society	Geo. Simcocks ...	9 and 10 Feb.	22, 23, and 24 Feb.
Stanwell ...	The Stanwell Agricultural Society ...	A. Spanner ...		
Stanwell ...	Stanwell District Farmers' Agricultural and Progress Association	W. Crowe		
St. George ...	Balonne Pastoral and Agricultural Association	T. M. Cummings ...		
Taabinga ...	The Taabinga Farmers' Progress Association	T. Pass		
Tannymorel, *viâ* Warwick	The Tannymorel Farmers' Progressive Association	Maurice Clifford ...		
Teutoberg ...	Teutoberg Farmers' Progress Association	E. M. Nothling ...		
Tiaro	Tiaro District Farmers' Progress Association	L. H. Riddles ...		
Tinana ...	Tinana Fruitgrowers and Farmers' Association	H. G. Habler ...		
Tingoora ...	Tingoora Farmers' Progress Association	Arthur Boisen ...		
Toowoomba...	Queensland Vine and Fruit Growers' Association	Hy. A. Tardent ...		
Toowoomba...	Royal Agricultural Society of Queensland	G. A. Leichney ...	1, 2, 3, and 4 Aug.	1, 2, and 3 Aug.
Townsville ...	Townsville Pastoral, Agricultural, and Industrial Association (formerly North Queensland Pastoral and Agricultural Association)	J. N. Parkes ...	6, 7, and 8 June	6 and 7 June
Upper Kedron	Upper Kedron Fruitgrowers and Farmers' Association	A. Marshall ...		
Upper North Pine	Upper North Pine Farmers' Association	J. Skerman ...		
Wallumbilla	Wallumbilla Farmers' Association ...	Edmund H. Yates		
Warren Siding	The Stanwell United District Farmers' Union	G. N. Terry ...		
Warwick ...	Eastern Downs Horticultural and Agricultural Association	F. H. Selke ...	15 and 16 Feb.	13, 14, and 15 Feb.
Wellington Point	Wellington Point Agricultural, Horticultural, and Industrial Association	Victor Drury ...	15 July	14 July
West Haldon, *viâ* Greenmount	West Haldon Farmers' Progress Association	A. E. Ayris ...		
Wondai ..	Mondure Farmers' Progress Association	W. E. Horne ...		
Woodend ...	Warren-Woodend Farmers' Club ...	W. Lehfeldt ...		
Woodford ...	Woodford Progressive Industrial Association	E. Heaton		
Woombye ...	Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society	P. S. Hungerford...	12 and 13 July	11 and 12 July
Woombye ...	Woombye Fruitgrowers' and Progress Association	E. E. McNall ...		
Wooroolin, *viâ* Nanango	Wooroolin Farmers' Progress Association	A. Deighton ...		
Yandina ...	Yandina-Maroochy Progress Association	Chas. Ablin ...		
Zillmere ...	Zillmere Horticultural Society ...	E. H. Decker ...		29 Sept.

Public Announcements.

The Editor will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

Secretaries of Associations are requested to be good enough to forward to the Editor, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published.

To enable recipients of the *Queensland Agricultural Journal* to have the half-yearly volume bound, covers in boards and cloth will be supplied from this office on application to the Under Secretary for Agriculture and Stock. Applications must be accompanied by a remittance of Sixpence to cover cost. For the convenience of those who are not within reach of a bookbinder, a Special Cover has been designed, which obviates the necessity for binding. These covers will be supplied at One Shilling each.

In order to avoid disappointment, correspondents who wish for replies to questions in the *Journal* are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

For the information of those who are desirous of communicating with the managers of State farms, we give their names and addresses below:—Queensland Agricultural College, Gatton, principal, J. Mahon; Westbrook State Farm, Westbrook, manager, C. Ross; Biggenden State Farm, Biggenden, manager, D. Macpherson; Hermitage State Farm, Warwick, manager, Alexander Martin; Gindie State Farm, manager, R. Jarrott; Kamerunga State Nursery, Cairns, manager, Howard Newport; Roma State Farm, manager, R. Soutter; Botanic Gardens, director, J. F. Bailey.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

PURCHASE OF STOCK AND PRODUCE FROM THE DEPARTMENT OF AGRICULTURE.

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Purchasers of Stock and Produce, Plants, Seed, &c., from the State Farms and Agricultural College are reminded that Sales from these Institutions are made for Cash only. Persons desirous of making purchases should, therefore, first ascertain the cost of whatever articles they desire to obtain, and remit the full purchase-money when sendiug an order.

STATE FARM, WESTBROOK.

PUMPKIN SEED.

SILVER NUGGET PUMPKIN.

The Seed of this, the best of all Table Pumpkins, is also an excellent strain.

Price: SIX SHILLINGS per lb.

Both the above have been saved from isolated crops, no other varieties of maize or pumpkins being grown near them.

To expedite delivery, application should be made direct to the MANAGER, Westbrook State Farm, together with remittance to cover Cost of Seed and Freight.

POULTRY.

GOLDEN WYANDOTTE COCKERELS, from He y Laying Strains, FOR SALE. Price: SEVEN SHILLINGS AND SIXPENCE ea pply to

T ANAGER.

NOMINATED IMMIGRATI

RESIDENTS OF QUEENSLAND

Desirous of Assisting their Friends or Relatives in the United gdom or other parts of Europe to EMIGRATE to Queensland, may procure ll Information from any Clerk of Petty Sessions, or from the Immigration Ag c, Brisbane.

The following shows THE SCALE OF PAYMENTS for Nominated Passages:—

Sex.	Between One and Twelve Years.	Between Twelve and Forty Years.	Above Forty and under Fifty-five.	Fifty-five and Upwards
	£	£	£	
Male	2	5	10	The full amount of Passage Money, £15 15s
Female	1	3	10	
Infants	Free			

COTTON SEED.

We have been requested to notify Cotton Planters that Messrs. J. KITCHEN AND SONS, Limited, are prepared to supply UPLAND COTTON SEED FREE for this year's planting, and that the firm will pay the railage on all Cotton consigned to them during this year and 1907. The railage which has been already charged to Cotton Suppliers will be refunded to those who have sent in supplies.

STATE NURSERY, KAMERUNGA, CAIRNS.

RUBBER, COCOA, KOLA-NUT, CAROB BEAN, KAPOCK, VANILLA, CARDAMOM, BREADFRUIT, DIVI-DIVI, GINGER, AND OTHER VALUABLE TROPICAL ECONOMIC PLANTS FOR SALE, AT NOMINAL RATES, TO SETTLERS AND FARMERS.

The Instructor in Tropical Agriculture notifies that PLANTS or SEEDS of the above useful and valuable AUXILIARY PRODUCTS may be obtained by application to the Manager, Kamerunga State Nursery. PLANTS available at any time. SEEDS when in season, BEING MOSTLY OF SHORT VITALITY, should be promptly applied for.

RUBBERS, KAPOCK, CARDAMOM, and especially rare Plants, or Seedlings difficult to raise, 1s. each, or 10s. per dozen; others, 6d. each, or 5s. per dozen. Seed, 6d. per packet. Plus packing, railage, or postage.

Remittances should accompany applications.

Lists of T[illegible] Economic Plants available may be obtained on application to the Manag[illegible] [illegible]nga State Nursery, Cairns, North Queensland.

RUBBER SEEDS AND PLANTS.

Vari[illegible] and Name.	Plants or Seed.	When Available.	Price.
Rambong or Assam (*Ficus elastica*)	Plants only	Any time ...	1s. each, 10s. per doz.
Para Rubber (*Hevea braziliensis*)	Plants ...	,, ,, ...	,, ,, ,,
,, ,, ,, ,, ...	Seed ...	Feb. to April	1s. per oz. (about 1 doz.)
Central American (*Castilloa elastica*) ...	Plants ...	Any time ...	1s. each, 10s. per doz.
,, ,, ,, ,, ...	Seed ...	Nov. to Jan.	1s. per oz. (about 100)
Iré or Logos Rubber (*Funtumia elastica*) ...	Plants only	Any time ...	1s. each, 12s. per doz.
Ceara Rubber (*Manihot Glaziovii*)	Seed only	,, ,, ...	1s. per oz. (about 50)
West African Rubber (*Tabernæmontana*) ...	Plants ...	,, ,, ...	1s. each, 10s. per doz.
,, ,, ,, (*Crassa*)	Seed ...	,, ,, ...	1s. per oz. (about 100)

Above prices are for delivery on the Nursery. If applicants wish Plants or Seed sent, packing, postages, railage to port, &c., are extra. Seed and small quantities of Plants may be sent by parcels post at purchaser's risk. Plants, being delicate, do not travel well by post.

Hessian-covered cases, holding one to three dozen, cost 4s. 6d. extra f.o.b. Cairns, whence they will be shipped "freight on." The demand for Seed being large and the supply limited, Orders received, with remittance, will be booked and completed as soon as Seed is available.

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